Mosquitoes, Malaria, and Malarine:
A Qualitative Study on Malaria Drug Use in Cambodia

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Strategic Objective 5

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Abstract

In 2004 a qualitative study on anti-malaria drug use was conducted in two Cambodian border areas—Sampov Lun District in Battambang Province and Sala Krau/Pailin Districts in Pailin Province. The purpose was to explore why use of first-line treatment for malaria is sub-optimal. Findings focus on: (1) why providers do not always offer biological diagnosis, (2) why practitioners prescribe and dispense drugs other than first-line treatment for malaria, particularly *Plasmodium falciparum*, (3) reasons clients do not use or adhere to first-line treatment, and (4) other factors which have an impact on anti-malaria drug use. This study provides data for decision makers to improve malaria drug use in order to decrease malaria morbidity and mortality in Cambodia.

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Key Words

Cambodia, malaria, drug use, qualitative research, artemisinin-based combination therapy (ACT)

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ACRONYMS

A&M	artesunate and mefloquine
ACT	artemisinin-based combination treatment
CNM	Center for Malaria, Parisitology and Entomology
GFATM	Global Fund to Fight AIDS, Tuberculosis and Malaria
IEC	information, education, and communication
IM	intramuscular
ITN	insecticide-treated nets
LLITN	long-lasting insecticide-treated net
M&E	monitoring and evaluation
MMSS	Malaria Medicines Supply Service
MoH	Ministry of Health
MSF	Medecins Sans Frontieres
MSH	Management Sciences for Health
NGO	nongovernmental organization
CNM	National Center for Malaria, Parisitology and Entomology
NTG	National Treatment Guidelines
PATH	Program for Appropriate Technology in Health
PSM	Procurement and Supply Management [GFATM]
RBM	Roll Back Malaria [Partnership]
RDT	rapid diagnostic tests
RPM Plus	Rational Pharmaceutical Management Plus Program
STGs	standard treatment guidelines
UNICEF	United Nations Children's Fund
USAID	U.S. Agency for International Development
VHV	village health volunteer
VMV	village malaria volunteer
WHO	World Health Organization

EXECUTIVE SUMMARY

This report summarizes a cross-sectional qualitative study undertaken in two border provinces of Cambodia, the overall purpose of which is to improve malaria drug use to decrease malaria morbidity and mortality. The findings reveal an almost universal knowledge of the need for biological diagnosis for malaria, but a gap between practice and appropriate drug use due to provider and client factors.

In September 2004, Management Sciences for Health (MSH), in cooperation with the National Center for Malaria, Parisitology and Entomology (CNM), the World Health Organization (WHO), and other malaria partners, conducted a follow-up qualitative study in two Cambodian border areas—Sampov Lun District in Battambang Province and Sala Krau/Pailin Districts in Pailin Province[1]—to explore the unanswered questions behind the 2002 quantitative study which revealed that—

- Sixty percent of market and village providers did not offer blood tests
- Only 11 percent of patients received the recommended prepackaged treatment
- Sixty-two percent of clients sought first treatment from a private sector source
- Village providers are an important but poor source of treatment
- Four out of 27 pregnant women surveyed received the recommended quinine treatment
- No children received the recommended treatment
- Adherence in the 92 people who took artesunate and mefloquine (A&M) was 84 percent compared to 62 percent of the 34 people who received Malarine,® but the sample size is small for significance.[2]

To complement these findings, the qualitative research question was to determine why Cambodian clients are not using the currently recommended first-line treatments for malaria. Specific enquiries included—

1. Why are providers not offering biological diagnosis?
2. Why are providers prescribing or dispensing malaria products other than first-line therapy?
3. Why are clients not taking A&M or Malarine or adhering to the regimen?

[1] European Commission Cambodian Malaria Control Programme, National Malaria Centre for Cambodia, Rational Pharmaceutical Management Plus Program, U.S. Agency for International Development, Wellcome Trust Mahidol Oxford Tropical Med Research Programme, World Health Organization. 2003. *Community Drug Use Practices in Malaria in Cambodia: A Cross-sectional Study.* Arlington, VA: Management Sciences for Health (unpublished report).
[2] Ibid.

4. What other factors are having an impact?

Methods to collect the data were freelisting (a powerful technique for studying cultural domains) and ranking, in-depth interviews, and observation.

Results reveal knowledge and practice gaps for biological diagnosis, providers' prescribing or dispensing habits, and problems in client adherence. In-depth interviews and observation indicate that biological diagnosis is not consistently offered for malaria due to several key factors—

1. There are periodic dipstick stock-outs in the public sector, particularly in Pailin.

2. Lab management problems exist at the public health center level.

3. Financial incentives and client demand motivate private practitioners to sell medicines, even inappropriate medicines, without biological testing.

4. Broader socioeconomic issues affect access, create service barriers, and determine clients' financial status, which is often related to treatment-seeking behavior.

This research reveals that the majority of providers and clients know that the most effective medicine for *Plasmodium falciparum* is A&M or Malarine. Artesunate monotherapy is also considered effective. Artesunate is considered the most expensive antimalarial drug.

Factors which explain why providers are prescribing or dispensing products for malaria other than first-line treatment are—

1. Public and private sector stock-outs of A&M and Malarine, respectively

2. Private practitioners prescribing and dispensing habits being partially driven by client demand for particular drugs and serums; client demand is often related to a short-term cost-benefit rationales

3. Lack of knowledge about first-line treatment for malaria in the private sector for pregnant women, children, and severe cases; the village malaria volunteers (VMVs), however, are trained and provide access to A&M, but data verified that other lay village providers do not have sufficient understanding of first-line treatment

4. Variability of product packaging; packaging of inappropriate drugs in small sachets is common practice

5. Lack of regulation of the private sector and where regulations exist, they have not been enforced

When providers do prescribe or dispense first-line treatment, impact is compromised by access barriers, clients' tendency to self-treat prior to any biological diagnosis, underlying beliefs about injections and serums, insufficient client targeting, and practitioners' poor instructions on dose and duration of use.

Lack of adherence to first-line treatment is primarily due to—

1. Lack of knowledge about the importance of adherence

2. Related practices which lead clients to stop a drug regimen prematurely, e.g., they feel better, experience side effects, or have the habit of sharing drugs

3. Indirectly, lack of enforcing regulations with private drug providers who have insufficient knowledge and counseling expertise

Cambodia's National Malaria Program is changing. Recommendations from this study are intended to successfully promote the government efforts and provide insight into improving malaria drug use. Policy structures need to be further developed. Selected practitioners should be trained in first-line treatment of malaria. Creative incentives should be put in place for public and private sector providers to encourage appropriate malaria diagnosis and treatment. Private sector regulations should be enforced. To improve quality of services for malaria in the public sector, the VMV and village health volunteer (VHV) programs should be monitored for effectiveness and coverage. The public sector reputation should be enhanced through quality improvements to reduce time and effort spent by clients to obtain appropriate treatment and to improve client satisfaction. Laboratory strengthening should be undertaken to ensure best practices. The drug supply system needs to be improved, most specifically correcting delays in first-line treatment supply and by monitoring drug use. To change clients' health behavior, the current implementation of information, education, and communications (IEC) needs to be expanded and monitored for appropriate use of biological diagnostics and malaria treatment. In conclusion, if these recommended interventions can be effectively monitored in terms of drug use outcomes, there is real potential to improve impact.

INTRODUCTION

Malaria is a major disease burden in the Mekong countries' border regions despite the implementation of regional and national malaria control programs. The rapid emergence and spread of antimalarial drug resistance has necessitated frequent changes in drug policy. In June 2001, Cambodia became the first country in the region to change to first-line antimalarial drug for the treatment of *P. falciparum* to an artemisinin-based combination therapy (ACT) of A&M. The Ministry of Health (MoH) supplies the public sector with A&M. The social marketing firm, Population Services International (PSI), has been distributing a brand-name of A&M called Malarine® to the private sector since March 2002.

A quantitative survey of community drug practices was conducted in September 2002 in four Cambodian provinces along the Cambodian-Thai border: Pursat, Battambang, Pailin, and Preah Vihear. The cross-sectional study revealed that—

- Sixty percent of market and village providers did not offer blood tests
- Only 11.4 percent of adults, 10 percent of children (5–14 years), and 2 percent of children under the age of 5 received the recommended prepackaged A&M
- Four out of 27 pregnant women surveyed received the recommended quinine treatment
- Sixty-two percent of clients sought first treatment from a private sector source
- Village providers are an important but unreliable source of treatment
- Adherence in the 92 people who took A&M was 84 percent compared to 62 percent of the 34 people who received Malarine, but the sample size is small for significance[3]

The study had been designed to answer questions about what and how many medicines are being prescribed and taken for malaria. A synthesis of the findings of the Cambodia Drugs Use Practices in Malaria in Cambodia Study highlighted several areas for further exploration (see Annex 1, "Suggestions Arising from the 2002 Community Drug Practices in Malaria in Cambodia Study"). To understand why providers and clients behave as they do, qualitative research was needed to inform future strategies and interventions.

Study Purpose

In September 2004, MSH/ RPM Plus Program, in cooperation with the NMC, WHO, and other malaria partners, conducted a follow-up qualitative study in two Cambodian border areas—Sampov Lun District in Battambang Province and Sala Krau/Pailin Districts in Pailin Province. The purpose was to explore the unanswered questions about why use of first-line treatment for

[3] European Commission Cambodian Malaria Control Programme, et al. 2003. *Community Drug Use Practices in Malaria in Cambodia: A Cross-sectional Study.*

malaria is suboptimal. This paper presents the findings with an aim to improve malaria drug use to decrease malaria morbidity and mortality.

Epidemiology and Malaria Control in Cambodia

Variations in malaria incidence in Cambodia over the last 25 years have been largely due to population movement into forested areas, where most transmission occurs. The cessation of military activities in recent years and prospects for resettlement have contributed to the increased migration, and further increase in the risk of malaria transmission. Migration has also factored into the spread of multidrug resistant strains of *P. falciparum* malaria from the Thai border region to other parts of the country.[4]

In December 2002, the MoH published its revised version of the National Treatment Guidelines (NTG) for malaria. These guidelines are designed for staff at each level of the public health system (referral hospital, health center, and health post) to improve case management of malaria and to reduce its mortality. The antimalarial drug policy was changed twice between 1998 and 2000, and new guidelines were introduced in 2003. One area of enquiry for this study has been to assess providers' knowledge of the current protocol for drug use.

Literature Review

Diagnostic Issues

Malaria diagnosis is often based on clinical symptoms in Cambodia as elsewhere, leading to misdiagnosis and inappropriate treatment for patients presenting with a disease caused by another pathogen. In areas with higher intensity malaria transmission, even the introduction of definitive diagnosis would not fully address this problem, as many malaria infections are asymptomatic. Thus the presence of parasites does not necessarily imply that malaria is the cause of the presenting disease.

Cambodia's NTGs for malaria recommend three steps to make a "confirmed" diagnosis for malaria—

1. Take the patient's history
2. Clinical examination
3. A positive diagnostic test

Diagnostic tests come in two forms—microscopic examination of a blood slide and rapid diagnostic tests referred to as "dipstick." The dipsticks are known in Cambodia as Paracheck test (for diagnosing *P. falciparum* malaria; it can remain positive for two to three weeks after the patient is cured), and OptiMal test, which can diagnose *P. falciparum* and other types of malaria. If a diagnostic test is not available, then the diagnosis is made according to history and

[4] Bury, L. 1999. *Malaria Risk Factor Study: Report on Pilot Study in Kampot*. National Malaria Centre, Ministry of Health and Cambodian Researchers for Development (unpublished report).

examination. Since it is possible, though unusual, for a patient with severe malaria to have a negative blood slide, the guidelines recommend treatment for malaria even if the slide is negative if the provider is sure the patient has the disease.[5]

Treatment According to the National Guidelines

For *P. falciparum*, Cambodia's National Treatment Guidelines recommend A&M as the first-line treatment for uncomplicated malaria in adults; quinine and tetracycline are recommended as the second-line treatment. For pregnant women with *P. falciparum* however, the first-line treatment is to give quinine alone for seven days. For children, treatment of uncomplicated *P. falciparum* is also A&M; quinine and tetracycline for children is only recommended if the first-line treatment has failed or if A&M is contraindicated for the patient.

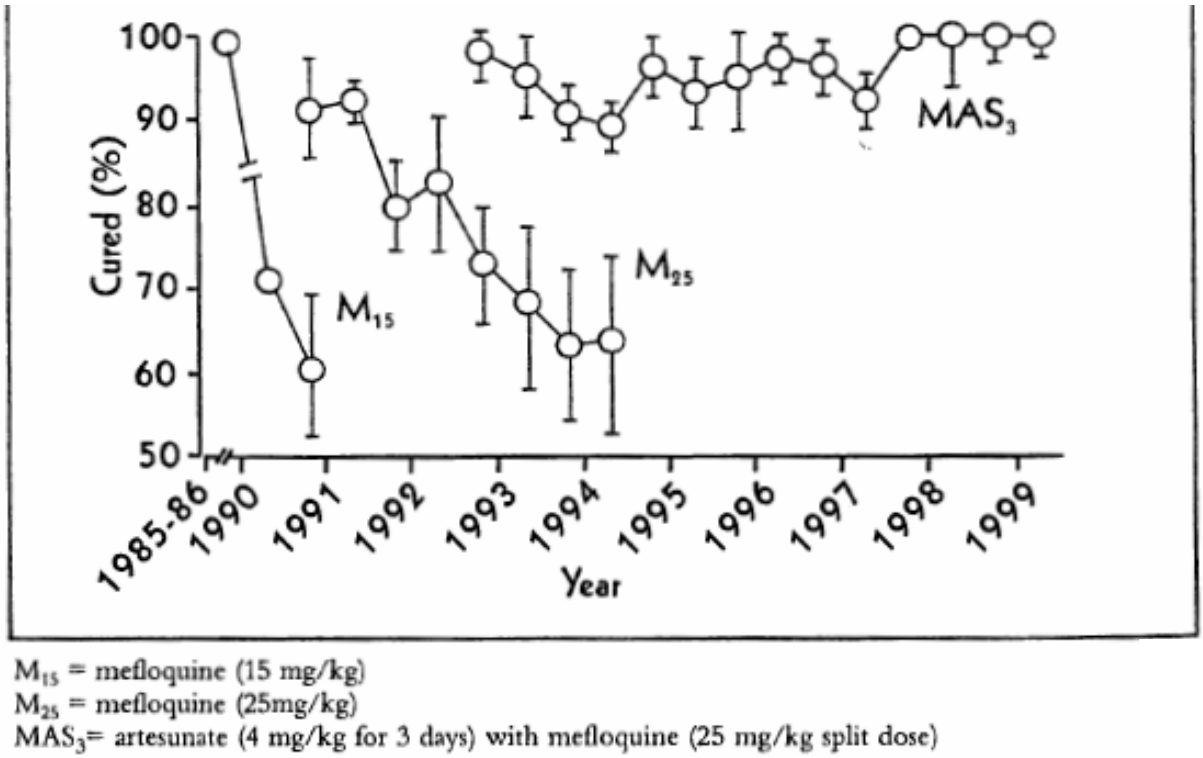
There are different treatment guidelines for severe or complicated malaria—for adults and children the first-line treatment is artemether intramuscularly and mefloquine, with artesunate suppositories recommended before referring to a hospital. Treatment of severe malaria in pregnant women during the first trimester is infusions of quinine alone followed by oral treatment for at least seven days after the patient recovers. During the second and third trimesters, first-line treatment for severe malaria in pregnant women is artemether intramuscularly and mefloquine, with the second-line treatment being intravenous quinine alone.

The recommended treatment for adults, including pregnant women, and for children with *P. vivax* or *P. malariae* is chloroquine. Resistance of *P. vivax* to chloroquine has not been found in Cambodia.

ACT for Malaria

The beneficial effects on antimalarial resistance and transmission depend on ensuring that the majority of *P. falciparum* infections are treated with ACTs and that the use of either component alone is curtailed. Treatment seeking behavior and client's adherence to completing malaria treatment thus influence resistance. Moreover, artemisinin derivatives used alone are associated with high treatment failure rates unless administered for seven days, which is not often achieved because patients often discontinue their use within two to three days when the symptoms are generally relieved. Artemisinin derivatives should only be used in combination with a second effective antimalarial such as mefloquine.[6] The largest series of therapeutic efficacy studies with A&M demonstrate a sustained increased cure rate (almost 100 percent from 1998 onwards) despite the established resistance pattern seen for high-dose mefloquine alone between 1990 and 1994, prior to the deployment of A&M (Figure 1).[7]

[5] National Malaria Centre, Ministry of Health, World Health Organization. 2002. National Treatment Guideline for Malaria in the Kingdom of Cambodia.
[6] Barnes, K. and P. Folb. 2003. *The Role of Artemisinin-based Combination Therapy in Malaria Management* (technical report). Washington, DC: Global Health Council.
[7] Nosten F., M. van Vugt, R. Price, et al. 2000. Effects of Artesunate-Mefloquine Combination on Incidence of Plasmodium falciparum Malaria and Mefloquine Resistance in Western Thailand: A Prospective Study. *The Lancet* 356(9226):297–302.



M_{15} = mefloquine (15 mg/kg)
M_{25} = mefloquine (25mg/kg)
MAS_3= artesunate (4 mg/kg for 3 days) with mefloquine (25 mg/kg split dose)

Figure 1. Cumulative rates (95% CI), assessed at day 28 for different regimens from prospective studies

The widespread use of ACTs was initially adopted in Thailand and Vietnam. More recently, Cambodia, Bhutan, and Myanmar have recommended it as first-line treatment for uncomplicated malaria. This same policy is being spread in South America and Africa, with the Global Fund to Fight AIDS, Tuberculosis and Malaria (GFATM) facilitating these changes.

On a global scale, the surge in demand has lead to a shortage of ACTs. WHO recommends that all countries facing shortages increase procurement of their second-line antimalarial treatment, which is generally quinine. Quinine used to be the mainstay of malaria treatment. Unlike chloroquine, quinine is still effective against *P. falciparum* malaria, but it is difficult to use because treatment takes longer.

Private and Public Sectors

Legislation and regulations targeting private practice are still being developed in Cambodia. The country has been actively developing health legislation since 1996. In 2000, a royal decree was passed approving the establishment of the Cambodian Medical Council/Board, the organization responsible for licensing medical and paramedical practitioners. The law on the Management of Private Medical, Paramedical, and Auxiliary Medical Services was passed in 2000. The government's enforcement capabilities still need to be strengthened, thus resulting in a gap between legislation and practice.[8] MoH data of 2002 confirms that most private facilities (80

[8] WHO (World Health Organization). 2002. *Private Practitioners in Phnom Penh: A Mystery Client Study*. Phnom Penh: WHO.

percent of clinics/polyclinics) were not registered as of 2002. Provincial specific data on the registration status of private pharmacies are scarce—95 percent of pharmacy depots and 75 percent of pharmacies out of a total of 81 private outlets in Kampong Chhnang Province were not registered by the provincial health directorate in 2002. Moreover, issues such as access, cost, and perceived quality of services may be equally or more pertinent issues.

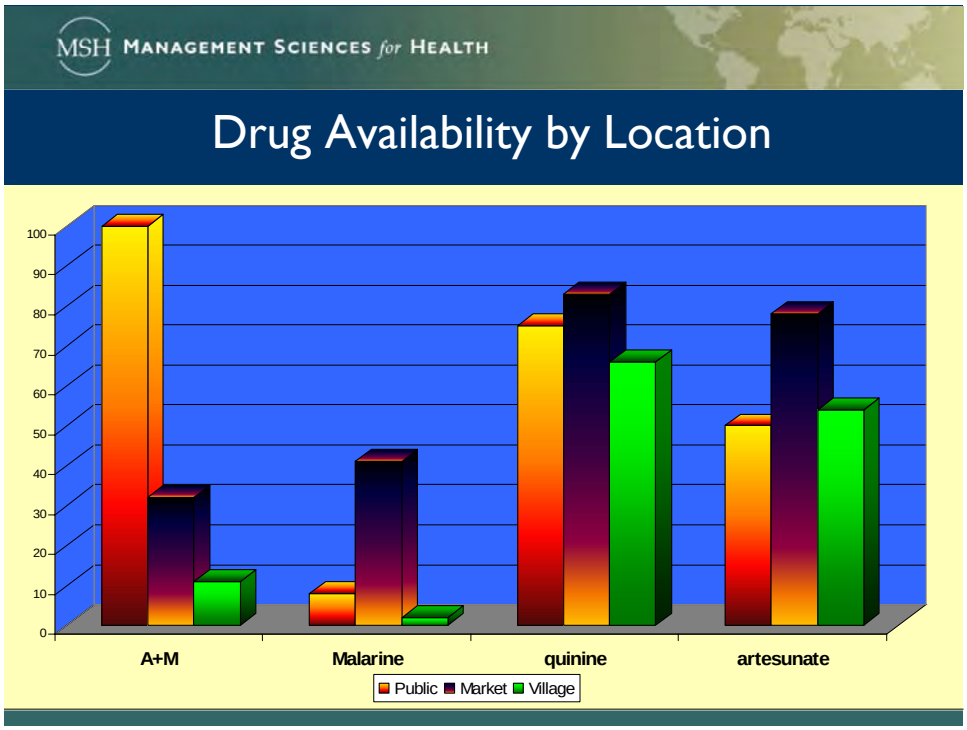
As highlighted in the introduction, the "Community Drug Use Practices in Malaria in Cambodia Study" found that less than half of private providers offered blood tests for malaria. Moreover, A&M was available in nearly all public facilities surveyed, yet only 11 percent of adult patients in the study received recommended prepackaged treatment.

The role of the private sector is particularly relevant because 62 percent of malaria patients surveyed reportedly sought treatment from a private provider first. Moreover, a mystery client survey conducted in 2002 to investigate the effectiveness of case management of a range of common diseases among 198 private practitioners in Phnom Penh found serious deviations in practices and compliance with national clinical guidelines. While the study was limited to a relatively small number of private practitioners in the capital, the results suggested ineffective treatment and wasted opportunities for care.[9]

To address the malaria diagnostic and treatment needs of the private sector, PSI has this year been expanding the social marketing of Paracheck tests and Malarine, the brand name for A&M.

The public sector continues to offer microscopy and dipstick testing, while stocking A&M. In fact, the quantitative "Community Drug Use Practices in Malaria in Cambodia Study" found that almost all public facilities surveyed had A&M in stock (Figure 2).

[9] Tawfik, Y. 2002. Including Formal and Informal Private Practitioners in Child Survival Programs in Cambodia: Outline for Developing a National Strategy and Plan of Action.



Source: Community Drug Practices in Malaria in Cambodia Study, 2003

Figure 2. Drug availability by location

RESEARCH QUESTION

To complement the findings of the quantitative study, the primary research question to be addressed by this qualitative research is—why are Cambodian clients not using the currently recommended first-line treatments for malaria?

Specific enquiries to answer the research question follow:

- Why are providers not offering biological diagnosis (microscopy or dipstick)?
- Why are providers prescribing or dispensing products for malaria other than than first-line therapy?
- Why are clients not taking the medicines (A&M or Malarine) or adhering to the regimen?
- What other factors are having an impact?

Proximate and Distal Determinants

To structure the study design and research instruments, we used a proximate-distal determinants framework. This framework is based on the idea that distal determinants such as poverty, social status, and education work through an intermediate level of environmental and behavioral risk factors such as access to services, health seeking behavior, and drug adherence. These risk factors, in turn, lead to proximal causes of death such as biological predisposition to disease. While the risks of morbidity and mortality from malaria have biologic components for pregnant women, for example, the risk is also a function of access to blood testing and availability of quinine during the first trimester.

The focus of this study is on medicine use in its broad definition. We highlight evidence about medicine use factors—intermediate and more proximal determinants of mortality—to identify health sector strategies and interventions that can improve outcomes. We categorize the health sector into public and private, and categorize respondents into three target groups (adults, caretakers of children, and migrants) to consider risk factors such as age, occupation, and propensity to migrate.

STUDY DESIGN

Methodology

Study Sites

To maximize between-group differences, the criteria for site selection included extent of appropriate antimalarial drug use as determined by the 2002 quantitative survey, geographic accessibility, and potential to conduct the interviews within two weeks. Of nine study sites in the 2002 quantitative survey (Figure 3), two districts in Preah Vihear Province had the highest proportion (43 percent and 40 percent) of appropriate antimalarial use, followed by Sampov Lun (38 percent) in Battambang Province. By contrast, districts with the lowest performance of following first-line treatment protocols were Sala Krau (18 percent) and Pailin (20 percent), both in the Pailin municipal area. Due to time constraints, Sampov Lun District in Battambang was selected as the relatively higher performing study site to compare with Sala/Krau District and Pailin municipality as the area with lower appropriate drug use. Preah Vihear Province was considered too inaccessible from Battambang and Pailin during the rainy season.

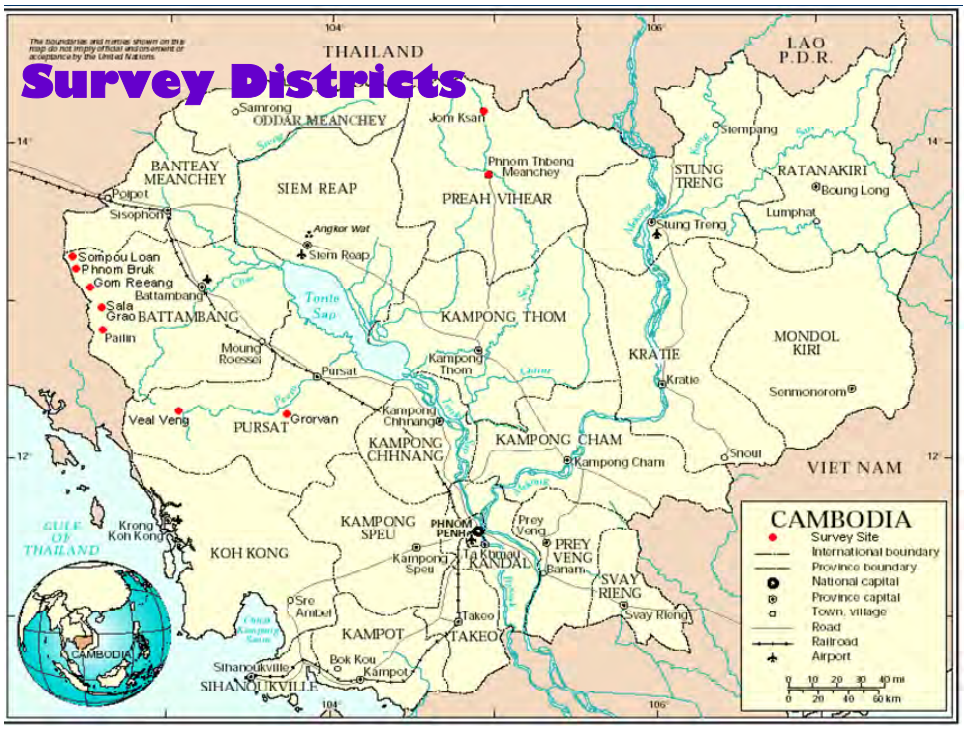


Figure 3. Survey districts from the 2002 quantitative *Community Drug Use Practices in Malaria in Cambodia Study*

Sample Population

The sample population for the core of this study consisted of providers from the public and private sectors and clients (or their children) treated with medicines for malaria within the past month. Further stratifying by provider type and client type, the research team interviewed—

Providers

- Public Providers—Medical personnel from the district hospital and health centers
- Private Providers—Drug sellers, drug depot/pharmacy staff, cabinet/clinic staff in market and village areas (Annex 2)

Clients

- Adults
- Caretakers of a child with malaria
- Migrants/new settlers

Ancillary interviews were conducted with MoH staff, including provincial health directors, operational district directors, district supply managers, and malaria officers as well as representatives from PSI. They were also conducted with village chiefs, VMVs, and VHVs.

Research Methods and Instruments

We used three research methods to collect data—freelisting, in-depth interviews, and observation.

Freelisting was used to learn about cognitive constructs and perceptions of—

- Malaria
- Malaria diagnosis
- Types of drugs used to treat malaria
- Cost and perceived effectiveness of malaria drugs

Respondents were also asked to rank the types of drugs they listed in terms of ease of use, cost, effectiveness, and the best overall. Due to the limited number of public sector facilities in this study, we did not use the freelisting method with public sector staff, but only conducted in-depth interviews with them.

In-depth interviews were conducted using semi-structured field guides to explore the key research questions with providers of malaria drugs and clients (or caretakers of children) who had been treated for malaria within the last month.

Each interviewer began data collection an introduction to the respondent, using a verbal consent process before proceeding with questions. Interviewers asked each respondent if it was all right to tape-record the conversation, and did so only if they agreed. If the respondent refused to be

recorded, the interviewer jotted down notes on key points to review during daily debriefings. All interviews were conducted in Khmer (Annex 4).

Ancillary interviews, e.g., informal individual and small group discussions, were held with villagers and providers throughout the study. The principal investigator and team leader walked through the markets and villages, observing and talking with providers and clients, occasionally joining an interview.

For quality control, daily debriefings were held with the research team to review findings, clarify techniques, problem-solve, and discuss procedures for the following days. Spot checks were done by exchanging taped interviews and commenting on ways to improve.

Sampling Scheme

A stratified sampling scheme was developed with targets of interviews for each type of respondent. Since villages were spread apart, some with many malaria patients and others with fewer to locate, a flexible approach was used to obtain sufficient numbers of quality interviews. The actual sampling netted a total of 173 interviews delineated by method in Table 1.

Field Implementation and Constraints

Study implementation began September 22, 2004, in Cambodia with data collection being completed October 10, 2004. MSH and its subcontractor, Program for Appropriate Technology in Health (PATH), engaged a Cambodian firm, Research and Development Center, to provide trained staff with the requisite language skills. The study commenced in Phnom Phen with meetings between MSH, WHO, PATH, the MoH National Malaria Center, and USAID. Orientation and training of the research team followed along with pre-testing of the research instruments in Kampong Speu Operational District on September 27. Data collection took place from September 28 to October 10, 2004. The National Centre for Malaria Control facilitated the research at all levels, providing an excellent opportunity to interview staff in the provincial health departments, operational districts, and referral hospitals. The directors at the operational district assigned staff to accompany the team to the villages and markets to explain the malaria program and help identify respondents. Emphasis was placed on minimizing selection bias and respondent bias.

Constraints were the limited time for data collection because the rainy (malaria) season was about to end and technical assistance was available for only two weeks until the Pcheun Bun holiday week. The rainy season made travel difficult over muddy roads as the team had to walk to distant households in the rural areas. Main roads were also blocked by massive trucks getting stuck in mud on unpaved roads.

Data Analysis

Freelisting results were compiled manually through counts. Data analysis for in-depth interviews was performed using Atlas TI software. Identifying information such as client names were removed from all data for confidentiality purposes. Electronic files of the original interviews are available in English.

Table 1. Actual Sampling Scheme by Method

Method	Sample Population	# Interviews Sampov Lun	# Interviews Sala Krau/Pailin	Total
Freelisting	Village private provider (drug seller/depot, cabinet/clinic)	7	6	13
	Market private provider (drug seller/depot, cabinet/clinic)	10	10	20
	Adult client (non-migrant)	10	6	16
	Client caretaker of child treated for malaria	10	8	18
	Migrant client	7	8	15
	Total	44	38	82
In-depth interviews	Village private provider (drug seller/depot, cabinet/clinic)	8	4	12
	Market private provider (drug seller/depot, cabinet/clinic)	5	5	10
	Public Provider (health center, referral hospital)	3	4	7
	Adult client (non-migrant)	6	8	14
	Client caretaker of child with malaria	6	6	12
	Migrant client	9	4	13
	Total	37	31	68
Ancillary interviews	Provincial Health Dept Chief and Deputy Chief	1	2	3
	Operational District Officer	1	1	2
	Operational District (OD) Supply Chief	1	1	2
	PSI sales rep/distributor	0	1	1
	Village Malaria Worker/ Village Health Volunteer	1	1	2
	Total	4	6	10
Observation	Severe malaria cases in referral hospital, total	2	2	4
	Client-provider interaction in public and private sector	Ongoing	Ongoing	—
Total interviews		87	77	164

RESULTS

Freelisting Results

Freelisting determines the most salient terms when asking clients an open-ended question. Since the aim is simply to understand how various sub-populations classify certain domains, such as causes of disease or treatment types, statistical significance is not paramount. The precise spelling of certain medicines may not be accurate due to transcription constraints. Select findings are presented in Tables 2 to 9 to show the variation and consistencies in freelisting data within and across groups.

Knowledge of blood testing was high among the private providers and clients sampled, when asked, "What is the best way to make sure you have malaria?" As seen in Table 2, 94 percent of 33 private providers responded with "blood testing." Additionally, 43 of 49 clients (88 percent) had a similar response. We expect this level of knowledge to be lower in the general population due to some selection bias since the clients interviewed were treated for malaria within the last month as a criterion for being included in this study. Providers are more sophisticated in naming the particular type of blood test, e.g., four of the 18 private market providers and two of the 13 private village market providers named microscopy, Paracheck, and Malacheck.®

Table 2. Freelisting Responses of Providers and Clients to, "What is the Best Way to Make Sure You Have Malaria?"

Private Providers

Responses	Market Provider	Village Provider	Total No.	Total, %
Blood test (including microscope, Paracheck, or Malacheck)*	18	13	31	94
Clinical symptoms	1	0	1	3
Consultation/blood test and symptoms	1	0	1	3
Total	20	13	33	100

*****The specific type of blood test was mentioned by 4 out of 18 private market providers and by 2 out of 13 private village providers

Clients

	Adults	Migrants	Caretakers	Total No.	Total, %
Blood test	13	16	14	43	88
Clinical symptoms	1	0	0	1	2
Consultation/blood test & symptoms	2	1	1	4	8
Not sure	0	1	0	1	2
Total	16	18	15	49	100

In response to the question, "What are all the different drugs to treat malaria?" we found that clients listed over 20 types of drugs for malaria, including dihydroartemisinin (AK), A&M,

artesunate, chloroquine, Larium® (mefloquine), Fansimef™ (mefloquine), mefloquine, quinine, Tra Moos (local name for chloroquine), Malarine, tetracycline, amoxicillin, ampicillin, chloramphenicol, cimet, "florate penecul," paracetamol, paradon (paracetamol), pondxopin, vitamins, injection, and blue/white/yellow pills. All medicines were recorded according to the respondent's statements and so it is difficult to determine the generic names for some medicines. In addition, data collectors may have recorded drug names based on the sound that the interviewees said and did not probe to find out the correct name of medicine.

Private providers such as health workers at clinics, cabinets, pharmacies, depots, and drug sellers in the market or village listed eight of the same drug types as well as artemisinin, artemeter, artemether injection, and cotexin (a brand of AK from China), along with "white and blue tablets from Thailand." While there is a close match between drug types cited by the clients and private providers, clients were more likely to list other inappropriate medicines. These results further validate the widespread tendency towards polypharmacy.

As shown in Table 3, when asked, "What drug do most clients ask for?" almost half of the 33 private providers interviewed said artesunate, as compared to 12 percent (9 percent for A&M plus 3 percent for Malarine) who mentioned a first-line treatment for *P. falciparum.* Only five of the 33 (15 percent) provider respondents mentioned chloroquine, which may reflect the greater familiarity with treating *P. falciparum* than *P. vivax*, given that the question was about malaria in general.

Table 3. Providers' Responses to, "What Medicines Do Clients Most Frequently Request?"

Medicine	Market Providers	Village Providers	Total	Total, %
AK	1	0	1	3
Artesunate	11	5	15	46
Artemisinin	1	1	2	6
A&M	1	2	3	9
Chloroquine (Tra Moose)	2	3	5	15
Cotexin	1	0	1	3
Malarine	0	1	1	3
Quinine	2	0	2	6
While and blue tabs	1	0	1	3
Combination	0	1	1	3
Missing response	0	1	1	3
Total	20	13	33	100

Interestingly, just over one-third of the private providers said they most often recommend A&M, Malarine, or Cotexin, with another one-sixth or so saying chloroquine (Table 4). Thus, less than half of the private providers claim to recommend a first-line treatment for malaria. There is evidence of ineffective differential diagnostics being made when a market provider claims he recommends artesunate "to unhealthy looking clients because it has no side effects and Malarine for healthy looking clients even if it has side effects because it cures."

Ten of 33 providers claim they most often recommend artesunate, suggesting that provider prescribing habits may be contributing to the heavy use of artesunate monotherapy, even when first-line treatment is available. Cotexin, though widely available and very effective in a two-day course, does not appear to be an obvious choice when making a sale.

Table 4. Which Medicine(s) Do You Most Often Recommend to the Client?

	Market Providers	Village Providers	Total No.	Total, %
A&M	3*	4*	7	19
AK/Artemisinin/dihydroartemisinin	1	2	3	8
Artesunate	7*	3	10	28
Arthemeter	0	1	1	3
Chloroquine	2	3	5	14
Cotexin	1	0	1	3
Malarine	4*	1	5	14
"Whatever the client demands"; "depends on client request"	4	0	4	11
Malarine or A&M**	(1)	(1)		
Artesunate *"to unhealthy looking clients because it has no side effects and Malarine for healthy looking clients even if it has side effects because it cures"*	(1)	0		
Total	22	14	36	100

*Includes all respondents who mentioned this drug
**Respondent mentioned both Malarine and A&M in the case of explaining the use of "A&M when Malarine is out of stock"
( ) Number of times where these two drugs were listed together
Total includes total number of times each drug was mentioned

Four of 33 providers admit that they sell based on whatever the client demands, highlighting the underlying motive of a commercial transaction. Private providers state that clients usually request artesunate as the preferred drug for malaria. Private providers generally cited artesunate as the drug as sought after by clients and most often recommended by providers. As well, they listed it most frequently as the most expensive antimalarial medicine (Table 5).

Clients who know antimalarial drug prices also mention artesunate's relatively high cost. Given the frequency with which financial considerations are mentioned as a factor for clients purchasing drugs, there clearly is an overriding preference for it (Table 6). Artesunate monotherapy is seldom used for the full seven days, resulting in recrudescent infections and increased risk of developing resistance. Future strategies and interventions need to address this issue in emphasizing ACTs. There is also variation in the price of Malarine as noted by private providers and clients. Private providers explain that the price of a blister pack of Malarine dropped from 80 to 25 baht within one month, while different clients mention prices ranging from 2,500 rials to 3,500 rials per blister pack.

Table 5. Private Providers' Responses to, "Which Drug Is Most Expensive?"

	Market Providers	Village Providers	Total No.	Total, %*
AK (3 baht/tablet)	1	0	1	3
Artesunate (1 U.S. dollar)/blister; 60 baht/blister; 8 baht/tablet; 10 baht/tablet)	3	5	8	24
Artemisinin	0	1	1	3
Artemether/artemether injection (80 baht/vial)	2	3	5	15
A&M (55 baht/blister; 70 baht/blister)	2	1	3	9
Cotexin (85 baht/blister; 90 baht/blister; 120 baht/blister)	5	0	5	15
Malarine (100 baht/blister; "25 baht/blister but last month 80 baht"; 30 baht/blister; 70 baht/blister)	3	2	5	15
Mefloquine/Larium (10 baht/tablet)	1	1	2	6
Pondxopin (2,000 rials/pack of 6 tablets)	1	0	1	3
Do not know	2	0	2	6
Total	20	13	33	99

*Due to rounding of individual percentages, the total percent does not add up to 100.

Table 6. Clients' Responses to, "Which Drug Is Most Expensive?"

	Adults	Migrants	Caretakers	Total No.	Total, %*
Artesunate (130 baht/blister; 50-80 baht/blister)	4	1	4	9	18
Antimalarial "Germ Killer" drug	1	0	0	1	2
Fansimef	0	0	1	1	2
IV fluid ("it depends on the number and quality of drugs they combine with the fluid")	1	2	1	4	8
Malarine (2500 rials/blister; 3 baht/tablet; 3,500 rials/blister)	1	4	2	7	14
Mefloquine/Larium (15 baht/tablet)	2	0	1	3	6
Quinine (5 baht/tablet)	0	0	1	1	2
Injection	0	1	0	1	2
Yellow tablet (30 baht/tablet)	0	1	0	1	2
Blue tablet (15 baht/tablet)	0	0	1	1	2
"All medicines are free at the nongovernmental organzation clinic"	1	0	1	2	4
They are probably all the same	0	0	1	1	2
Do not know	6	6	2	14	29
Missing/inappropriate response	0	3	0	3	6
Total	16	18	15	49	99

*Due to rounding of individual percentages, the total percent does not add up to 100.

When asked, "Which drug is most effective? Which [drug is the] next [most effective]?" private providers and clients most frequently start the list with Malarine (Table 7). This is an encouraging finding as both providers and clients articulate Malarine's value. Private providers also mention A&M. This likely indicates knowledge of A&M as first-line treatment and the fact that A&M (distributed through the public sector) is being sold in the private market. No clients mentioned A&M in the freelisting (Table 8). A few clients could not name any drug, citing such reasons as "I don't know…all of the tablets…are mixed together." Such a response reflects another constraint to appropriate drug use—packaging which confuses clients because providers sometimes mix pills into plastic sachets.

Table 7. Freelisting Results of Private Providers When Asked, "Which Drug Is Most Effective?"

	Market Provider	Village Provider	Total	Total, %*
AK/artemisinin/dihydroartemisinin	2	3	5	14
Artesunate/artesunate injection	1	3	4	11
Artemether/artemether injection	0	1	1	3
A&M	2**	1**	3	8
Chloroquine/"Tra Moose"	1	1	2	6
Cotexin	2	0	2	6
Malarine	9**	5**	14	39
Mefloquine/larium	1	0	1	3
Quinine	2	0	2	6
Do not know	1	0	1	3
Missing response	0	1	1	3
Total	21	15	36	102

*Due to rounding of individual percentages, the total percent does not add up to 100.
** Includes all respondents who mentioned this drug. One market provider and two village providers listed both Malarine and A&M as most effective because these drugs "are equally effective."
( ) Number of times where these two drugs were listed together.
Total includes total number of times each drug was mentioned.

Table 8. Freelisting Results of Clients When Asked, "Which Drug Is Most Effective?"

	Adults	Migrants	Caretakers	Total	Total, %
AK/dihydroartemisinin	1	1	0	2	4
Artesunate/artesunate injection	0	2	5	7	14
Artemether injection	0	0	2	2	4
Chloroquine/"Tra Moose"	1	1	1	3	6
Cotexin	0	6	0	6	12
IV fluid	1	4	1	6	12
Malarine	4	3	3	10	20
Mefloquine/Larium	1	1	0	2	4
Quinine	0	0	2	2	4
Fansimef	0	0	1	1	2
Blue tablets	1	0	0	1	2
"All medications are the same; they are all effective"	1	0	0	1	2
Do not know	7	0	0	7	14
Missing response	0	0	1	1	2
Total	17	18	16	51	100

The importance of targeting private providers in reaching clients with malaria is reinforced by the data which indicate that at least half of respondents sought care initially from a private provider—whether it was a market or village drug seller, pharmacy, or clinic (Table 9). Hospitals and self-treatment were sometimes cited as a first source of care. The fact that few clients mentioned the VHV needs to be considered within the current context. VHVs and VMVs are part of a newly evolving malaria program rollout.

Table 9. Freelisting Results for Clients When Asked, "Where Do You Go to Get Treatment for Malaria?"

	Adults	Migrants	Caretakers	Total	Total, %*
Self treat/medicate	3	3	1	7	14
Private provider (clinic, drug seller; private health provider in the village)	7	10	8	25	51
VHV	1	1	0	2	4
Public health center/facility	2	1	1	4	8
Hospital	3	3	4	10	20
Missing response	0	0	1	1	2
Total	16	18	15	49	99

*Due to rounding of individual percentages, the total percent does not add up to 100.

Biological Diagnosis: Results of In-depth Interviews

The key research question addressed in this section through the in-depth interview method is, "Why are providers not offering biological diagnosis (microscopy or dipstick)?" According to the quantitative survey conducted in 2002 on Cambodia malaria drug use, 60 percent of private providers did not offer blood tests. Public sector health centers and hospitals are supposed to offer biological diagnostics and be equipped with microscopes and dipsticks.

The data below lay out the issues that contribute to sub-optimal testing for malaria. A reasonable proportion of private practitioners in the market areas offer dipstick testing, though they do not require a test or prescription to sell antimalarial drugs. At the village level, only dipsticks are available, but dipsticks only detect *P. falciparum.* Therefore, when people have a negative result they start treating themselves for *P. vivax.* If, after a couple of days they still are not feeling better, they think that they may have typhoid, and start treating for typhoid with drugs from the local private provider. Although microscopy can detect both *P. vivax* and *P. falciparum,* microscopes are relatively expensive and thus tend to be limited to use by market providers and the public sector services. Private providers do not always offer biological diagnosis due to their own incentives and disincentives, which are tied to client demand.

This is a cross-sectional study, the results of which paint a picture of the current state of testing as social marketing of dipsticks expands.

Results from In-depth Interviews with Public and Private Providers

There are only two reasons found to explain why the public sector does not offer biological diagnosis. First, there have been public sector dipstick stock-outs at the operational district level, though fewer at the Sampov Lun site than at the Pailin site. In Pailin, for example, there were no dipsticks the operational district for the last two months of 2003. Medecins Sans Frontieres (MSF) supplied dipsticks in the interim. In Sampov Lun referral hospital, there was a stock-out of dipsticks for only one week in the year prior to this study. Second, there are lab management problems. Reportedly, microscopy is not available at night. One health center claimed that their lab technician was unmotivated and was not on hand to do his work.

By contrast, there are four main factors elicited from the private sector in-depth interview data which explain, "Why are providers not offering biological diagnosis (microscopy or dipstick)?" First, private drug-sellers perceive their role as selling drugs rather than testing. Moreover, there is an underlying financial incentive to sell drugs.

Second, there is suboptimal client demand in the private sector for blood testing. Clients have limited funds, so sometimes they prefer to spend them on drugs rather than testing. Clients also self-diagnose, associating their symptoms with their own previous experiences of malaria, or that of other people in endemic areas, such as "My relative had the same symptoms."

Moreover, private providers hesitate to purchase dipsticks because they believe "microscopy is better than dipsticks," yet microscopes are too expensive for most providers to afford and they may not have the skills to use one. Private providers claim, "People here only trust the

microscope because dipsticks only test for *P. falciparum*." Private drug sellers and cabinets complain that dipsticks cannot measure the severity of malaria.

Dipsticks have just recently been promoted through the PSI social marketing program which has been promoting dipsticks in Sampov Lun and Pailin/Sala Krau. There have been occasional stock-outs as the program gets underway.

These factors become clear in the following data from private providers. Text which has been omitted is indicated by ellipses so that only key information is presented.

Role as Drug Seller with Profit Incentive

Private drug sellers perceive their role as a source of drugs and a business within the community. Practitioners with some medical training tend to have their own private clinic from which they sell drugs. They are aware of their profit margins but incorporate their drug selling role within their larger role as a clinician.

> *Market drug seller, Psar Pahy, Pailin:* Most people living here know about this [blood testing]. These Khmer Rouge people know about it.
>
> *Interviewer:* Do you want to use it some day, and if not, why not?
>
> *MDS:* No, I don't, because…the clinics often buy drugs from me. They are the ones specialized in treating the patient, but I am skillful in selling drugs, not treating patients…I only sell pills. As for the clinics, they do the blood testing and give serum injections.
>
> *Market Cabinet, Kilo 13, Sampov Lun:* For a [Paracheck dipstick] blood test...I get very little profit…I buy it a price of 12 baht, so I get very little profit….
>
> *I:* Therefore, you only get 3 baht [$ .07] profit?
>
> *MC:* Yes, yes…I cannot charge more than this. I have to observe the client's living standard.

Suboptimal Client Demand for Testing Despite Availability

Some private providers stock dipsticks, but do not always use them because of a suboptimal demand from clients.

> *Private cabinet, Sampov Lun:* If the patients want to have their blood tested, I will perform the test; but if they simply say they have malaria, I will sell the medicine which they request.
>
> *Village drug seller, O'Breus Village, Pailin:* Here we use a dipstick [but] I ask them to go to the health center for a consultation because I am not a physician, I am just a seller….
>
> *Interviewer:* Why don't you yourself test their blood?
>
> *VDS:* I have told them about it, but some patients don't want to get their blood tested here…. To be a well-known drug seller, I have to let them go where they want in order to keep warm relations.

> *PC:* Well, some people come here after they get their blood tested, and some just ask for malaria treatment…but most people here tend to get their blood tested when they have a high temperature…some patients get their blood tested in my shop, and then they can buy medicine at another pharmacy…and also some patients get their blood tested at another pharmacy and buy medicine at my shop.

A sizeable proportion of private practitioners who operate clinics and cabinets appear to work in the public sector as well. A 47-year-old provider who offers clients blood testing told the research team that he also provides medications for malaria based on clinical diagnosis alone. He uses dipsticks but thinks they "can't help determine the virus," and so takes the blood to the referral hospital lab for further diagnostics. The fact that he takes the blood to the referral hospital lab suggests he works there. This cross-over of the public and private sectors was evident throughout the study. Such a link between the two sectors is a conduit for diffusing information on appropriate drug use.

Provider Acceptability: Perceptions of Microscopy and Dipsticks

The streets of Sampov Lun market and Pailin town are lined with various drug sellers, clinics/cabinets, depots, and pharmacies. The trade name Malarine appears on posters amid the dozens of pharmaceuticals for sale within the glass showcases of many drug outlets. While no promotional advertisements for dipsticks appear in the market, there are a number of signs advertising microscopy services. In one clinic/cabinet on the main street corner of Sampov Lun market, a medical doctor could be seen prominently from the street using a microscope—several customers were lined up to see him for various maladies. The interviews about biological testing for malaria reveal why fewer drug outlets offer malaria testing with microscopes than with dipsticks.

> *Private provider, O'Tapouk, Pailin:* Microscopy is better because we can check everything…when we use the dipstick we can only check for *P. falciparum*….
>
> *Interviewer:* Why don't you use any blood-testing tools?
>
> *Village drug seller, O'Chhra, Pailin:* I cannot afford to buy it. Furthermore, I am busy with field work, and on the side sell some drugs…. People who have known me since the war still come to me.
>
> *I:* Is the blood test service available at your cabinet?
>
> *Health Cabinet, Kilo 13 Sampov Lun:* No, it isn't…I offer treatment according to the symptoms…I used to have it before.
>
> *I:* But nowadays do you have such equipment?
>
> *HC:* Yes, I do…I recently have purchased Paracheck. I can also provide clients blood-test services, but I rarely do the blood test for them. I don't want to do the blood test for them because when I use Paracheck, it's hard to see the virus. Sometimes I can see the virus with Paracheck and sometimes not. That's why I don't want to do the blood test, and I tell them to have it done at other cabinets…[Paracheck] can tell me whether a patient has malaria or not, but it can't tell me whether the patient has cross one or two type…. When the clients come, I ask them whether they want to have blood test at my cabinet or not. If they want, I will use it. If they want to have blood test at other cabinets, I let them go.

Interestingly, the above quote, which is similar to other interviews, suggests potential methodological undercounts in the earlier quantitative survey regarding use of biological diagnostics. The respondent initially says he does not offer blood testing, but upon further probing, clarifies he does. The implication is that there may have been undercounts in the quantitative study conducted in 2002 due to the nature of the survey methodology. For this respondent and others, the probing nature of the qualitative technique eventually elicits a positive and apparently valid response to the question of whether the provider offers testing.

Information-Education-Communication (IEC): Social Marketing of Dipsticks

A key factor which could explain why dipstick testing was not common practice during data collection for the quantitative study in 2002 was that not until 2004 did PSI begin a major push on the social marketing of dipsticks in the study site areas. Clearly, some private providers are convinced of the value of dipsticks.

> *Interviewer:* Have you ever used that blood testing tool?
>
> *Market drug seller, Psar Pahy, Pailin:* I went to a training where they taught me about it, but I haven't used it. It has just become available…. Before I give them [clients] drugs I ask about their condition, whether they have a high temperature, chills, headache, or rheumatic fever. From my observation of these symptoms they most certainly have malaria.
>
> *Private health provider, O'Tapouk, Pailin:* I never check by microscope, but only use the dipstick…. Microscopy is more complex than dipsticks and the patients won't wait for us…. The fastest diagnosis is five minutes. I always buy those dipsticks by the package but now I'm out of stock. I am rarely out of stock because someone always sells them to me…also because there are always unlimited health organizations in this area so I can use theirs, too. PSI sells us [dipsticks] for 1,000 riels; we sell them for 1,500 riels. But right now they've increased to 1,500 riels, so I have to sell them for 2,000 riels.

Results from In-depth Interviews with Clients

The data from the client interviews reveal key reasons for a suboptimal demand for biological testing. Related to the demand for testing are factors related to client's financial status, treatment seeking behavior, barriers to the public health services, and general development issues.

Adults and Biological Testing

There is a tendency for clients to self-treat based on their symptoms until the case becomes more serious. This is due to habit and a desire to use their limited funds for drugs rather than for testing and drugs. However, the vast majority of adults interviewed express an awareness of the need for malaria testing.

Interviewer: How do you know that you have malaria?

32-year-old male, Othmor Village, Sampov Lun: I went to have a blood test. People in this village, when they have such symptoms, they always go to have a blood test.

———————————

Interviewer: How do people know that they've caught malaria?

41-year-old male, O'Breus Village, Pailin: By having a blood test…. If you can't find out the illness from a simple blood test, you can have a blood test by culture. We can have it done in Battambang.

I: And where do other villagers go if they want to have a blood test?

41-year-old male: They can have it here in this village.

A common theme that emerges from the study is that from the client perspective, there is a preference for private sector services.

35-year-old male, Olavea Village, Sampov Lun District: They [patients, usually] go to a private hospital.... The state hospital takes so long to conduct the blood test.

Interviewer: Do you know how long does it take for the private hospital to test one's blood?

35-year-old male: Around half an hour.

I: What about the state hospital?

35-year-old male: I have never gone to the state hospital.

Access to testing in the villages is also enhanced by the National Malaria Center's VMV program and improvements in road conditions. The government is expanding its training and supply of VMV who perform dipstick tests and provide A&M. In one village, the deputy chief serves as the VMV and owner of a private sector drug outlet. Outside his shop, which is fully stocked with groceries and a variety of medications, sits a white bucket filled with used dipsticks. In this same village, a woman in her 40s tells the research team that there were no malaria deaths this year in the community, although two to three years ago, six or seven people died of the disease. She claims that the construction of a road to improve access to the main road is the primary reason for the improvement.

Caretakers and Biological Testing

Caretakers appear to have similar patterns in diagnosing their children's illness as they do for themselves, as shown in the following quotes. The initial reaction to a light illness is to treat with drugs obtained from a local private practitioner rather than obtain a biological diagnosis. This practice is already documented in the literature on Cambodian health care. When the illness becomes more serious, patients seek diagnose and treatment from informal or formal health care providers. One explanation is that public health centers are closed during the weekends and evenings. Several caretakers claim that health providers critique them for hesitating before obtaining a diagnosis.

Interviewer: Why do people always seek immediate treatment for malaria? What are the consequences if they don't?

23-year-old female caretaker, O'Rael Village, Pailin: Sometimes, we are stricken by an intense fever when we are sitting and chatting. It's quite unexpected. If we have cross five [a scale to indicate the severity of malaria with one being mild and five being very serious], the provider won't treat us. Even with cross one or two, the providers still ask us why we keep the disease for so long. We would say because we don't have any money. We have to wait until we can earn the money. We're blamed for keeping the disease for so long and allowing the disease to get so serious even thought we've just got the illness for two three days.

I: Oh! Why does it get serious so quickly?

23-year-old female: Usually, we feel malaria everyday. It strikes us little by little every day. Then, it becomes serious very quickly. We think it's all right at first and take Para [paracetamol] or anti-headache tablets and the disease seem to be dormant for a while.

I: Then you stop taking the drugs, don't you?

23-year-old female: Yes. And when we become seriously ill, we go to the hospital [laughter].

Migrants and Biological Testing

There are subtle differences between the migrants and the two other respondent groups regarding biological diagnosis. First, migrants voice more monetary concerns about testing presumably because their economic status is often more precarious than long-time residents. Because migrants are temporary settlers, they may not have a consistent social network from whom they can borrow money. The research team observed that one village chief, whose wife was a village malaria worker, had allowed a migrant to stay at his home while she recovered from malaria because the migrant had no satisfactory options and lacked money for food. Second, because these migrants work in the forests and their exposure to malaria is greater than in non-forested areas, as documented by other studies, migrants articulate a strong familiarity with the disease and distinguish between treating simple and severe malaria.

Interviewer: I want to know clearly what someone does if they have malaria….

35-year-old female migrant, Otavao Commune, O'Broeus Village, Pailin: They go to have a blood test…at Pailin Hospital…. Some patients go to the public hospital, others who are rich go to the private pharmacy….

I: So someone who goes to the public hospital is poor…?

35-year-old female: Well, the public hospital and private pharmacy are the same…they both take money from us! The blood test [in the public sector] costs 20 baht [$.50], and a bed is 300 baht [$7.50]…[in the private hospital] a blood test costs 40 baht [$1.00]…and one bottle of serum is 200 to 300 bath [$5–$7.50]. [Our people] like getting treatment at the private hospitals because they have good services. At the public hospitals they don't.

I: Why don't you go to have a blood test at that hospital again?

35-year-old female: I don't have money to go there. I am too lazy to go there. My illness isn't serious yet.

———————————

Interviewer: …so how does a person find out for sure that they have malaria?

23-year-old male migrant, Spean Youl Village/town, Sampov Lun District: When a person can't eat, they always ask for drugs from a doctor.… He/she goes to get blood test, but for me, if I know that I have malaria, I would not go for blood test…no need to have blood test.

———————————

Interviewer: If next month you have the symptoms that are similar to malaria, what will you do?

20-year-old male migrant, O'Lvea Village, Sampov Lun District: I will hurry to get the blood test in order to prevent it from getting worse.

Prescribing and Dispensing Practices: Results of In-depth Interviews

The quantitative survey had indicated major problems with prescribing and dispensing. As mentioned earlier, only 11.4 percent of adult patients, 10.2 percent of children (aged 5–14 years) and 2.0 percent of children under age five received the recommended prepackaged treatment for *P. falciparum.* The survey also showed that 62 percent of clients sought first treatment from a private sector source, suggesting that there are serious issues in the private sector that constrain appropriate drug use. The survey concluded that village providers are an important but unreliable source of treatment. Moreover, particular populations are at risk as indicated by the fact that only 4 of the 27 pregnant women surveyed received the recommended quinine.

The richest source of data to explain why clients are not using the currently recommended first-line treatment for malaria comes from an exploration into the question, "Why are providers prescribing or dispensing products for malaria other than first-line therapy?"

Public and Private Provider Data on Prescribing and Dispensing

There are six key factors elicited from the public and private sector providers which answer this enquiry.

1. Public sector providers experience stock-outs of A&M while Malarine is increasingly coming onto the private market, usually but not always in sufficient quantity.

2. Private providers are heavily influenced by client demand for particular types of drugs. The price of a particular drug also influences the client's ability to pay for it. The client's financial situation and drug pricing influences the prescribing and dispensing of drug types and quantity.

3. Providers are also heavily influenced by client preference for the use of "serum." Serums are intravenous solutions, including 0.5 percent glucose solution, 0.09 percent plus glucose, and probably saline solutions, though it is not clear from the interviews if "serum" refers to any of these solutions in particular.

4. There is a lack of knowledge about first-line treatment for malaria in the private sector for pregnant women, children, and severe cases. Except for village malaria volunteers

who are trained and provide access to A&M, lay village providers have even less knowledge than most market providers about appropriate drug use.

5. Product packaging varies with some tablets being prepackaged in blister packs and others being sold with a variety of pills in small sachets.

6. The private sector has not been closely regulated and where regulations exist, they have not been enforced.

Regarding availability of first-line therapy for malaria in the public sector, Annex 3 contains lists of commodities selected at the level of operational district, referral hospital, and health center. At the operational district level drug store in Pailin, malaria medicines listed are chloroquine tablets, mefloquine tablets, quinine dihydrochloride ampoules, praziquantel tablets, quinine sulfate tablets, tetracycline tablets, artemeter ampoules, artemether tablets, artesunate tablets, artesunate rectocap, A&M 2 blister packs (for children), A&M 3 blister packs (for adolescents), A&M 4 blister packs (for adults), and Malarine blister packs. (A&M comes in three types—A&M 4 for adults, A&M 3 for adolescents, and A&M 2 for children.) Artemisinin suppositories are listed but are neither in stock nor being ordered, and no quantity is listed as required. According to interviews in Sampov Lun District, suppositories are not well-accepted in hospitals due to the lack of privacy in the wards. However, suppository use was not cited by the respondents as problematic at the health center level, though nobody was using them and they are not in stock. In Sampov Lun District, the director of the operational district stores was in the process of narrowing the commodity list for Sampov Lun Referral Hospital down to 61 items, 52 of which are drugs. For malaria, the two drugs selected are artemeter ampoules and A&M 4 blister packs. The 27 commodities selected for the health center level include 23 drugs, with A&M 4 blister (50 mg and 250 mg) being the sole drug for malaria treatment. Curiously, quinine is not on the health center list, but probably because pregnant women are referred to the district referral hospital.

The sample size of public health center staff was limited in the current study to three centers and one district referral hospital in each of the two study areas. All of these eight sites had A&M 4 in stock at the time of the study.

As context for the private sector availability of first-line therapy, it is important to recognize that PSI has just been expanding its social marketing program for Malarine in the study site during the months prior to the current research. Advertisements of Malarine were prominently displayed in the markets of both Sampov Lun and Sala Krau/Pailin.

An interesting finding is that although A&M is supposed to be distributed only through the public sector, where there are periodic stock-outs of this drug, it is being sold through the private sector. When directly asked about the source of A&M, several private practitioners replied that they obtain it from a pharmacy in Battambang, and one showed the research team the address of the distributor.

Stock-outs

Whereas the public sector relied on MSF to provide them with dipsticks in times of stock-out, no mention was made of alternative sources for A&M. Presumably, the providers resort to monotherapies in such a case. Several centers reported a stock-out of A&M—one with A&M 2, another in A&M 4. The private sector occasionally reports stock-outs, but they report they can purchase pharmaceuticals from other shops in the area in such cases.

> Interviewer: Now I want to ask you more, what kinds of drugs do you have in this health center?
>
> *40-year-old male health center director, Sala Krau Commune, Pailin:* For malaria, I have only A&M and chloroquine….
>
> *I:* Are they in stock?
>
> *40-year-old male:* Yes, they are.
>
> *I:* Do you have any other drugs besides those drugs and which aren't tablets?
>
> *40-year-old male:* …There are artesunate [ampoules] and mefloquine [ampoules]…. A&M is already packed in package.
>
> _____
>
> *Interviewer:* What do you do when drugs are out of stock?
>
> *43-year-old male counselor at public health center, Chak Krey Commune, Sampov Lun District:* I write about it in a report. I then report it to the senior…to the hospital OD in order to get drugs.
>
> *I:* Will your proposal be approved?
>
> *43-year-old male:* Yes, we cannot be out of stock for a long period…A&M is not often out of stock…[mefloquine] used to be out of stock for a long time…A&M 2 has been out of stock for two months.
>
> _____
>
> *Interviewer:* For A&M, has it ever been out of stock…?
>
> *28-year-old male, O' Taprang, Pailin:* No problem for this one. In the past, we can say that it was out of stock but we dispensed drugs with artesunate plus mefloquine….
>
> *I:* How often are they out of stock in a month?
>
> *28-year-old male:* Just only two or three days. But this is no problem because we have mefloquine plus artesunate…. Just occasionally, [we have stock-outs] because there [the Ministry] doesn't have it….
>
> *I:* The OD doesn't have it too, right? When A&M 4 is out of stock, for example, how would you check this medicine?
>
> *28-year-old male:* We check and we must think how much we use in a month. And we make it balance by seeing if we have reserved medicines in stock or not. But sometimes we know that some medicines are insufficient in the reserved stock…sometimes, the cases decrease so it still remains in stock. And sometimes, we have it in stock but the cases increase, and we are nearly out of stock…A&M 2 is never out of stock….

I: [W]hy is it never out of stock?

28-year-old male: Because…the children are rarely ill….

I: How about A&M 3, as it ever been out of stock?

28-year-old male: Never out of stock…because we seldom use it. For teenager, there are no problems.

39-year-old male, Market Cabinet, Kilo 13, Sampov Lun District: Actually, sometimes we face stock-outs of Malarine because this one is only sold by PSI…PSI does not sell us as much Malarine as we order. They sell this medicine in a limited amount only…. Well, we can go to some other markets [to purchase it] but the price is a bit higher than buying from PSI…PSI sells Malarine at a cheap price…I do not remember [the cost]…it's about 2,500 rials [$5.50] for about 10 or 12 small packages…. PSI also does not sell different amounts of Malarine, even for my aunt's pharmacy which is big. My aunt wants 10 boxes but PSI will not offer them to her…If PSI does not limit the amount, then some rich people can buy and sell Malarine for a higher price because it is the drug primarily used here…it is cheap but effective…. I mostly offer Malarine….

Interviewer: How many patients do you see per week?

39-year-old male: It's difficult to say. It depends on the weather. In the rainy season there are some venders who sell Malarine directly in the malaria-affected areas…there are some patients who visit us here when they fall into a serious condition….

I: On average, how many patients visit you per day for malaria?

39-year-old male:…about two patients per day. Most of them who visit me are malaria positive…among 10 patients, seven of them are malaria positive.

Client Demand for Specific Medicines

As in the case of biological testing, client demand is a significant factor in determining the private providers' practices with respect to the medicines they prescribe. Although Malarine is highly visible in the glass display cases throughout the market areas of both Sampov Lun (Kilo 13) and Pailin marketplaces, private practitioners tend to sell monotherapies at the request of the client. There is a profit incentive operating here, for the streets of both markets are abundant with drug outlets.

39-year-old male, Market Cabinet, Kilo 13 town, Sampov Lun District: …[W]hen asked what kind of medicine they want, the clients always mention artesunate or chloroquine…I mostly offer Malarine, but some people here tend to give artemisinin instead…. If we sell them amounts other than what they want, they will not accept it! [laughter]

Interviewer: When patients with *P. falciparum* come to you, what drugs do you provide to them?

51-year-old male, Market Cabinet, Kilo 13 town, Sampov Lun: I provide them dihydroartemisinin…or I provide them quinine….

I: In summary, which drug for *P. falciparum* is most often sold at your cabinet?

> *51-year-old male:* [T]he drug artesunate…. [These drugs] are similar to each other, but nowadays, the number of patients with *P*. v*ivax* is increasing…it's up to the patients. If they need quinine, I will offer them quinine…. It depends on their likes…. If they need the drug and I won't provide it to them, they will go to buy it another store.

Interviews with providers reveal a preference for injections even when Malarine is available.

> *Interviewer:* What kinds of malaria drugs are available at your clinic?
>
> *47-year-old male, private clinic, Bordenniev, Pailin*: They mostly use artemether [injection]…. The pills are not used as often. There are some NGOs come to offer malaria drugs…. Malarine is mostly provided by…MSF…. But I don't use it that much at my clinic because it has strong side effects.
>
> *I:* In general, what kinds of drug related to malaria are there at your clinic?
>
> *47-year-old male*: There is quinine, chloroquine. …I have artesunates…I have only these three kinds…. They all are Thai products…[but]…artesunate, I bring from Phnom Penh. It is Chinese product. But now, there is a new country produces this drug, as well. I couldn't remember the name of the country? I provide them these drugs; according to their diseases…following the guideline of the Ministry of Health…. If they buy artesunate, I only provide them artesunate. If they buy quinine, I offer quinine…. Some of them only buy enough for one or two times of use. For the clients who live very far from clinics, they buy a whole strip of drug, because they have to go the forest/mountain….
>
> *I:* So, you cut the drugs from the strip to sell, as well?
>
> *47-year-old male* : Yes…for the clients who live near the clinic, they buy enough to use one or two times. But for the clients who are far from the clinic, they buy a whole strip…chloroquine, the clients rarely buy….
>
> *I:* Have you ever run out of any of these drugs?
>
> *47-year-old male* : No, I have never…I go to Chaborie, Thailand, to purchase the drugs."
>
> *I:* By the way, among the malaria drugs you have, which one do you most often provide to the clients?
>
> *47-year-old male:* Artemether injection is most often provided to the clients.... There aren't so many clients this month but there were many in July and August. When the dry season comes, there are not so many malaria clients. And the clients come from different places….
>
> *I:* Besides artemether injection, amongst the pills, which one is most often provided to the clients?
>
> *47-year-old male:* Quinine is most often provided to the clients…. In July and August, there are about five to 10 or 15 clients a day.

Client Demand for Intravenous Solutions (Serum)

Client demand also plays a key role in the driving the use of intravenous solutions (serum) for the treatment of malaria. Ten of the 31 clients interviewed indicated that they had received serum as part of the treatment for their most recent case of malaria. Its use is most prevalent in the

private sector—including use at the household level (some respondents indicated that the provider treated them with the serum at their homes).

> *Interviewer:* When your child got sick, from whom did you first seek help?
>
> *48-year-old female, O'Lvea Village, Sampov Lun District:* When she got sick I bought a drug from a drug store near my house. I gave my child paracetamol…. When they [my children] have a temperature or light *kchol* [common word among locals meaning a feeling of uneasiness, tension, headache, nausea], I *kos kchol* [scrape the skin with a disk of metal leaving long red abrasions on the body] them and then give them paracetamol…. I had given her the drug for three days, then brought her to the physician…. I brought her to the health center but it didn't work on Saturday, so I brought her to this Pet [physician]. This physician also works for the [public] health center…. I brought my child home and then called physician Ra to come to my house to test her blood and infuse serum.

Lack of Knowledge about First-Line Treatment

To understand the accreditation of health personnel in Cambodia, it is important to recognize that many of the medical staff in the study areas were trained as nurses by the Khmer Rouge through on-the-job experience. There was no standardized curriculum per se for these practitioners.

The staff in charge of the public health centers and referral hospitals are aware of the national protocol for malaria treatment and dispense A&M for malaria. However, while the officers in charge of the health centers were well-versed in first-line treatment, not all medical staff dealing with patients have memorized the national protocols. The provincial health department says that the public health services "provide the correct dose, but people don't follow, especially when they have only a little money and buy only a few tablets."

The majority of private drug depots and cabinets/clinics in the market areas know that monotherapies such as artesunate, chloroquine, mefloquine, and arthemeter injection can treat malaria, but are not knowledgeable about the national protocol or the rationale for using artemisinin-based combination therapy. There is even more variation in knowledge and misinformation about malaria drugs among simple drug sellers in the villages because their source of information is second-hand, usually from the private drug outlet in the market area where they purchase their own supplies.

> *Interviewer:* Excuse me, sir. What class were you in?
>
> *47-year-old male, Spoung Village, Sala Krau, Pailin:* Before I wasn't a physician. I was a nurse.
>
> *I:* How long did you study to become a nurse?
>
> *47-year-old male:* This area is called an integration area. So, they don't have any clear diplomas which are recognized by the Ministry yet. Actually, we have an elementary degree, we haven't a secondary degree. We don't know clearly about theories, but we have experience, although, sometimes we are in bad situation. We can help and save people's lives who live along the border. It means that we can work. The Ministry came here one time and evaluated our ability. Then they decided to assign us certain levels—some got a doctor degree and some got a secondary degree. We don't remember all the theories because our courses are so short.

———————————

Interviewer: Have you ever heard about the national policy on malaria treatment?

39- year-old male, Market Cabinet but also works at public hospital, Kilo 13 town, Sampov Lun District: Why not…I am working in the state hospital.

I: What do you remember about the treatment of serious malaria from that policy?

39-year-old male: In fact, I have never participated in the dissemination of that policy, but I know that there is a national policy on this stuff. I have only learned the technical aspects and how to diagnose the disease.

I: I see. Have you learned something about treatment of simple malaria?

39-year-old male: No.

I: How about the treatment of children?

39-year-old male: No.

I: How about the treatment of a pregnant lady?

39-year-old male: No.

I: Thanks.

_____

40-year-old female working in a health cabinet, Boeung Pralith Village, Sampov Lun District: I used to own a restaurant. I sold Chinese noodles, rice, and coffee…. I have just started here three months ago.

Interviewer: Where did you learn how to open such a place?

40-year-old female: I learned from a professor at the state hospital…that doctor has been working on this for a very long time, since the previous generation. He has a degree, and he knows all the medical theories and treatments for all general kinds of diseases…I learned from him. The first disease he taught me about was malaria. Concerning the *P. falciparum* type, the patients have to take four pills of chloroquine the first day. The second and third day they have to take two pills. Oh, sorry! Two pills, because the total is seven pills…. He [the professor] comes to teach my relatives—my niece, children, and me…He teaches us everyday in the evening. He teaches me how to treat malaria and stomach diseases. He started three months ago…. He…tells me which drugs to use and I am the one who gives the injection according to his order.

I: Before this, had you ever studied about drugs?

40-year-old female: No, never, only from him. I did not attend school in the past regime...I can only read…I remember that this drug can cure this or that disease….

In O'Thmor Village, of Sampov Lun, a village drug seller in her late 20s says she had previously not heard of A&M or Malarine. With her face marked by mosquito bites, she explained to the research team that she had recently been sick for a couple of weeks so went to a private provider in Sampov Lun market. She purchased 12 bottles of serum, but did not recover. She went to another private provider, telling him of her symptoms and illness. He gave her A&M 4 and told her to take it for three days. She returned home and took the medicine for just two days, and felt better. Though she did not take all the medicine for the full three days, she believes A&M 4

cured her malaria so she decided to buy the medicine to sell in her village. When asked how she knows how to prescribe the drug to the client, she explains that the private drug seller in the market told her how. However, when our data collector pointed to several drugs and asked how to prescribe each one, she did could not answer.

The overwhelming majority of public and private providers are cautious treating pregnant women. They are aware that women are at special risk of malaria, and that the first trimester is a vulnerable stage. However, they do not articulate that the risk is due to the vulnerability of the immune system during pregnancy, or that this risk is higher for women during their first pregnancy. The national protocol advises quinine alone for seven days for treatment of pregnant women with *P. falciparum.*

Public providers are definitely more knowledgeable than village drug sellers, and more knowledgeable than private market drug depots and cabinets. According to the O'Chra health center chief in Pailin, pregnant women with malaria cross one can be treated at the health center, but those with more severe cases who appear at the health center are referred directly to the operational district level. The O'Chra Health Center follows the national guidelines for pregnant women with malaria, giving quinine to those in their first trimester and treating those four months pregnant or more with A&M 4. However, at another public health center in the current study, staff said you can give A&M during the first trimester to a pregnant woman. Private clinics claim to usually refer pregnant women, though appropriate protocol is not universal. Their interviews suggest a fear and/or gap in knowledge on treatment protocols for this population.

> *Interviewer:* For a pregnant woman, do you offer the same drugs and doses as to a normal adult?
>
> *32-year-old male, public health center practitioner, O'Chra, Pailin:* Yes, the same…I do find it difficult to decide whether to offer drugs to her. First, I am worried that if I give her drugs, she will have side effects because malaria is strong. So before I offer drugs to her, I ask her some background, such as "how long she has been pregnant?" If she is pregnant only two months, we can't offer artesunate. We have to offer 300 mg of quinine tablets. She has to take it three times per day, one time is three tablets. She has to take the drugs for a week.

Regarding prescribing and dispensing drugs for children, neither public nor private providers interviewed use suppositories for treatment of malaria. In the past, suppositories were offered at the public health facilities, but not now. Most providers and clients stated there is no problem to using them if they were available. However, the head of the drug supply at one of the Operational Districts reported it is a problem; people are shy and there is little privacy. In public facilities where A&M is dispensed, and among the VMVs interviewed, there is evidence of a knowledge base about the use of A&M 2 to treat children. Among private providers, there is an awareness that dosages of antimalarial drugs should be lower for children than for adults, but the provider invariably needs to refer to the drug packaging to prescribe.

Prescribing and dispensing habits to treat migrants was not significantly different than that of other adults, except that private providers note that this transient population tends to rely on credit, or to purchase only a few pills at a time due to financial constraints.

Product Packaging

The research team observed village drug sellers preparing sachets of up to four types of medicines for a client complaining of headache and malaria. It is common practice to dispense drugs in Cambodia using the sachets. This appears to be partly due to the fact that client can afford to pay for only a certain number of pills at a time.

Regulation and Enforcement

The National Malaria Program is in the process of developing a strategy to closely monitor the private sector, but until now there has been no effective enforcement of the national guidelines for malaria drug use in the private sector at the study sites. In fact, Cambodia, along with other Mekong countries, has recently been struggling with fake drugs that have been distributed throughout the region. According to the director of the National Malaria Center, when data is available concerning the type of drugs and number of patients being seen by the private sector for malaria treatment, a strategy can be implemented. The operational district in Pailin was in the process of preparing a policy to regulate private drug sellers as a follow-up to communications issued by the MoH at the national level.

Client Perspectives on Provider Practices and Other Barriers

There are four key factors elicited from the client data which further explain why they are not receiving first-line treatment for malaria. While some of these related to why providers are prescribing or dispensing products other than first line treatment for malaria, most are broader health sector issues.

1. Although A&M was shown in the 2002 quantitative survey to be available in over 95 percent of public health facilities, clients experience major access barriers in obtaining it from the public sector such as—

    - Economic access
    - Time because clients have to wait in line
    - Geographic access and related transport costs because public providers are usually farther away than the nearest private providers
    - Client perception of poor quality of care at public facilities and high quality in the private sector; high quality care from the perspective of the client includes access to credit, and injections and serums for treating illness to satisfy the belief in the power of these forms of medication.

2. The specific needs of pregnant women, children, and migrants have not been appropriately addressed, requiring special strategies and interventions based on their particular risks.

3. Packaging of drugs into sachets is commonly mentioned by clients as a form in which they receive tablets, with or without clear instructions on dose and duration of use.

4. Several of the clients interviewed reported having sought care from multiple sources or from the same source repeatedly. Clients' treatment-seeking behavior for malaria sometimes starts with self-treatment with medication prior to any biological diagnosis, as found in the free listing results. Subsequently, they will seek care from the private or public sector and may return to the same provider or seek out another provider if they do not improve or if they are not satisfied with the initial treatment they have received.

Access: Economic, Information, Service, and Quality of Care Barriers

Almost every interview with a client reveals the access issues they face in obtaining treatment for malaria. Access issues are a contributing factor to progression of a simple case to a severe case.

> *Interviewer:* …Have any malaria patients in your village died?
>
> *43-year-old male, Travchhou Thmei, Sampov Lun District:* Yes, there are some…. He came from Kampong Cham Province to live here and earn a living. He was a young boy. While he was earning a living, he started to get a little hot and there was nobody to cure him. Also, he didn't have any money so he got a fever and died.
>
> *I:* How many people have died from malaria?
>
> *43-year-old male:* Two people.
>
> ———————————
>
> *Interviewer:* When our people go to get the treatment from the public hospital, what kind of drugs are they offered?
>
> *35–year-old female migrant caretaker, O'Broeus Village, Otavao Commune, Pailin:* Quinine.
>
> I: Anything else?
>
> *35-year-old female:* Usually they provide us quinine. If we have enough money we are provided artesunate—artesunate or other good drugs.
>
> *I:* How much money do they pay to be offered artesunate?
>
> *35-year-old female:* Sometimes 40, 50 or 100 Baht to some guards there. If we give them, our illness recovers soon. If we don't, it depends on our fate…[for 50 baht] they give us one package of artesunate…I don't know for how many days. I only know that for one day they told me to take 2 tablets…one in the morning and one in the evening.

Public referral hospitals and private clinics or cabinets offer serums for treating malaria and other illnesses. The research team observed staff at the referral hospital providing serum to a teenager who had tried to commit suicide. While not a malaria case, the observation validated the preference for the private sector among most clients due to higher client satisfaction. Clients see the private sector as clearly offering higher quality of care services. Among malaria patients, the pattern is the same.

Interviewer: Do you know why do they go to the public health facilities?

28-year-old male, O'Real Village, border of Stoeung Kach District and Pailin District: Because of the lower service fee [laughter] and they don't have money.

I: …Why do people go to the private health provider?

28-year-old male: There are more people going to see the private health provider. They provide rapid service…. We have money [laughter] we get treatment with drugs and a serum and then take a motor taxi back home immediately.

Risks of Pregnant Women, Children, and Migrants

Given that the medical risk from malaria for pregnant women is higher than that of other adults, it is not surprising that the research team observed a disproportionate number of pregnant women with severe malaria in the intensive care unit of the Pailin Referral Hospital. Two of the five patients in the intensive care unit had been pregnant when they were struck with malaria. One had delayed getting treatment because she thought the symptoms were related to morning sickness, and in fact, proceeded to have a spontaneous abortion. This case suggests that the vulnerability of pregnant women needs to be emphasized in the information-education-communication component of the malaria program.

The only serious cases of malaria among children were those in stories of children who had died of the disease; no children with a serious case were observed during the current study although serious cases of adults and pregnant women were found. The few observable cases of children with malaria seen during interviews with caretakers suggest a relative infrequency of childhood cases coming to the formal health system for medicines. The statistics collected at the O'Chra Health Center in Pailin show that only two out of 140 confirmed malaria cases in July, 2004 were children under age five; 14 out of 140 were aged 5-14 years. In August 2004, only 4 out of 161 total cases were children under age five. Nearly a third of all cases in September 2004 were *P. falciparum.*

The quotes which follow from migrant caretakers highlight the particular vulnerabilities of both children and migrants. The private practitioner's inappropriate prescribing habit for a child is compounded by the migrants' vulnerability due to a tenuous financial situation, lack of permanent social networks while working away from their home villages, distance to the main markets, and exposure to mosquitoes by living or working in the forests.

Interviewer: The doctor gave you based on the money you have…she does not tell you how many drugs to take, right?

25-year-old female migrant caretaker, O'Thmor Village, Sampov Lun District: No. If I have money I can ask them to give the drug, I limit the amount of money that I want to buy the drug, but if I don't have money, I can owe her.

I: Concerning the first time that you bought the drugs to take by yourself, what kinds of drugs did you buy?

25-year-old female: I just buy anything [laughter] I bought the beehive, paracetamol, and tetracycline to take.

I: What is beehive?

25-year-old female: The beehive has two colors…I took them based on the number of days, and by the time I felt better, I would just stop….

I: What about your son? What did the doctor give him?

25-year-old female: He was given paracetamol and a malaria drug–quinine….

I: How did she give to the child?

25-year-old female: It was necessary to break into smaller parts…before when he was given the drug, and after taking the drugs, his body became short of blood. I mean the two kinds of drugs–two pills together with a small pill, I did not know what it was….

I: Small and what color?

25-year-old female: White and a small pill. It was given together with quinine which was broken into four pieces, paracetamol broken into two pieces. After using too much quinine, my son faced a shortage of blood because he was just around one year old…. He was given a half each time. She set the day for us, and said he should be given the medicine three times per day like an adult.

I: How many days had he taken the drugs?

25-year-old female: Three or four days, but it had been almost 15 days, but still he had not recovered…he had taken it [the drug] everyday regularly at a certain time both day and night.

I: Quinine?

25-year-old female: Yes, I continued to buy it when he finished it, and the doctor who visited him gave him more…the same ones. After taking all those pills, my son became very pale…I could not afford to cure my son's disease because I owed the owner of the private clinic already. Because he did not recover, so I took him to the provincial hospital. Before I heard that they charge there…for instance we have to pay for the bed, but the drugs are given for free.... After hearing this, I dare not take my son to that hospital because I did not have money. Furthermore, I had a shortage of food…money…it is really difficult. I thought that treating him in private clinic would make him recover soon, but it did not work. I took him to the Provincial hospital and I was blamed for bringing him in so late because he was short of blood and his blood cells were destroyed.

I: What else did they say?

25-year-old female: His blood cells were destroyed.

I: How is he now?

25-year-old female: He died that evening. The doctor pumped the blood from him, but there was no more blood. His body swelled after we used so much quinine, and there was no blood in his body. When they were pumping the blood from him, his blood cells were destroyed and he died in the evening on that day because we could not get the blood to supply him.

I: So he was given the drugs for almost 15 days or half a month, right?

25-year-old female: Yes, it was a long time.

I: Had he been given suppositories?

25-year-old female: No, he had not.

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*35-year-old female migrant, O Thmor Village, Sampov Lun District: …*Some people don't go to have blood test until they have malaria…because they are very poor…[laughter]. Oh, they are afraid of death. They have to find out about a treatment when they have malaria…the cabinet is very far because they live in the forest.

Product Packaging and Prescribing

The common hearsay that drug sellers fill small sachets with pills to dispense to their customers was verified during the research through observation. In rural shops, where villagers sell drugs along with coconuts, candies, drinks, and basic commodities such as soap, the research team found drug sellers dispensing packaged drugs such as paracetamol along with sachets of pills for treating malaria. None of the drugs in the sachets was Malarine, A&M, or chloroquine for a patient claiming to have malaria. Even for monotherapies dispensed in this manner, there are problems with inadequate prescribing of dose and/or duration.

23-year-old male, missing name of village/town, Sampov Lun District: …[T]hey take it (the pills) out from the strip…they break the strip, pull the medicine out, and put in the bag. They limit it to taking one bag at a time.

Interviewer: How many kinds of medicines do you to take at one time?

23-year-old male: I forget.… It's long time ago…I know one…artesunate…

I: They told you to take it how many times per day?

23-year-old male: …two times per day, once in the morning and once in the evening…

I: Did you take only artesunate or was it in combination with other kind of medicines?

23-year-old male: …It's mixed with others…in one package....

Interviewer: What kind of medicine?

33-year-old female caretaker, Trav Chou, Sampov Lun District: Mostly long tablets—blue, pink, white, and red.

I: Did you know those medicines?

33-year-old female: They said that those medicines are for malaria…[he took the tablets] two days, morning and evening…one blue, one red, meaning one each.… It seems nothing changed, he was still hot and cool, so I decided to send him to hospital to get serum and injection….

I: So, what medicine did they give you?

33-year-old female: I didn't know, small white pills, some big and some long, white tablets. There is nothing left because usually they gave us the pills and put them in a plastic bag….

I: How much did you spend for that treatment?

33-year-old female: More than 2,000 baht including medicines…[including food and transportation]…approximately 3,000 baht....

Self-treatment Prior to Diagnosis

25-year-old female migrant, O'Thmor, Sampov Lun District: I am 25 years old.

Interviewer: [A]nd how old is your child who is sick [with malaria]?

25-year-old female: [O]ne year and one month…a boy…. When I was in my hometown, my son used to get malaria too. He had chills regularly at 9 o'clock. After having chills, he felt better. I am a mother…I observed my son. After giving him the pills, his temperature went down for a while, and he went out to play, but when it's time, he had chills again, I gave him pills again. I was busy working so I didn't observe him always [laughter], the state hospital is far so we can't go there. Moreover, it costs us a lot for transportation. He had the blood test there in my hometown, but I didn't pay for the service immediately after the test. I owed them because we know one another…they used a square glass [microscope]…. When someone has malaria and has no money, they treat themselves at home or go to the state hospital and stay there for treatment. They go to state hospital only when the condition is worse and then they don't have money for the treatment…. They fear death. The condition is serious, and they know they cannot treat themselves…. Some people would just come here to work for one or two days only. If they get malaria, they would just buy the drugs and take them; they rarely go to the hospital…because they don't have money…. They work for others, so they can afford only to buy the drug...and if they have relatives, they borrow money to pay for transportation to go back home, so that their parents can help pay for the treatment. After they recover, they come back to work to pay off the debt.

Use of and Adherence to First-Line Therapy: Results of In-depth Interviews

Previous sections have highlighted some of the key factors in use of and adherence to first-line treatment in the context of the prescribing and dispensing practices of providers. A few other pieces of evidence strengthen the argument that adherence is a function of existing regulations and enforcement of drug providers, knowledge and counseling expertise of providers, and knowledge and community practices on appropriate drug use.

Public and Private Provider Data on Drug Use and Adherence

The provider data above has explained why clients use drugs other than first-line treatment for malaria. The disturbing finding is that even those providers who are aware of proper prescribing habits feel compelled to sell or dispense drugs to satisfy the client. The frustration and yet acceptance is revealed in the following quote.

39-year-old male, Cabinet, Kilo 13 Market, Sampov Lun District: Artemisinin…. It's a kind of tablet contained in a bottle. One bottle is for four days. It's is used only for patients older than 16 years of age; a person is to take two tablets each day for four days. This morning there was a patient asking for 12 tablets…. He told me he needs these 12 tablets to recover. And he told me that on the first day he takes four tablets, two in the morning and two in the afternoon…and after the first day, he takes two tablets every day…. I have no idea where he learned this. We have to sell them as much as they want.

Client Perspectives on Drug Use and Adherence

Most of the findings on antimalarial drug adherence are derived from client perspectives. Lack of knowledge about the importance of adherence is the underlying reason why clients stop the anti-malaria drug regimen prematurely—because they feel better or due to side effects—or because they share their drugs with family members and neighbors who also are sick.

> *35- year-old female migrant caretaker, O'Broeus Village, Otavao Commune, Pailin:* We buy them [the drugs] from the market drug seller.
>
> *Interviewer:* What is it called?
>
> *35- year-old female:* …artesunate…I still have a tablet….
>
> *I:* And how many days [does your son take it]?
>
> *35- year-old female:* Three days. Sometimes he takes two times and he becomes better, so he stops taking it anymore.
>
> ———————————
>
> *Interviewer:* It's not about your own case, but what's the general situation of malaria like in O'Thmor Village?
>
> *21-year-old male migrant, O'Thmor Village, Sampov Lun District:* In the past, there were a lot of forests in our O'Thmor Village and malaria was then prevalent in this region. But as most of the forests have been cleared, there aren't cases of malaria now.
>
> ———————————
>
> *22-year-old female, Orael Village, Sala Krao District, Pailin:* I was provided chloroquine and I took all the medicine. I still have malaria. I wonder why. At the time, I took it only three times and I shared it with my husband for awhile…because I had…only a pack of drugs I offered my husband a chance to use it. So, I only took it three times and I still have malaria.

Other Factors Impacting Malaria Drug Use

This was a cross-sectional study in which results should be interpreted in light of other macro- and micro-environmental determinants.

Geography and infrastructure development are clear contextual factors affecting the disease and mortality outcomes from malaria. The team observed clients and lay drug sellers who lived in remote areas had lower levels of knowledge about rational drug use.

In terms of governance, the local authority structure in the respective study site provinces and districts has an effect on program impact. In both areas, the Provincial Health Department and OD offices were very forthcoming with information and facilitating the research. The unique local power structures partly determine how national policy is implemented at the provincial and operational district levels. These are also the levels at which regulation and enforcement of national policy will most directly occur. People in positions of authority whose responsibility is theoretically to enforce regulations may potentially be in situations which are costly in terms of political power if they enforce the national malaria drug policy.

Cambodia's National Malaria Program is in the process of scaling up in 24 provinces. The government has requested funds from the GFATM Round 5 for malaria. Major components of the scaling-up include expansion of the VMV and VHV programs. Increasing numbers of VMVs are being trained to diagnosis with dipsticks and provide care with first-line treatment. VHVs will be trained and supplied with bednets. The evidence from this research was that the VMVs increase access to quality diagnosis and treatment, although the evidence was limited and there was some critique of certain village workers who did not meet an expected standard.

There was no obvious finding which explained the variation in appropriate antimalarial use between Sampov Lun in Battambang Province and districts with the lowest performance in first-line treatment protocols (Sala Krau and Pailin, both in the Pailin municipality). There are several explanations. There could have been a selection bias in either of the two studies, though attempts were made to minimize such methodological issues. More likely, the measure of appropriate antimalarial use was still relatively low in both sites (< 50 percent) so the entire set of factors leading to this low performance measure need to be addressed and prioritized in terms of cost, effectiveness, and impact.

DISCUSSION

Summary of Findings

A triangulation of freelisting and in-depth interviews indicate seeming contradictions in knowledge of and use of biological diagnostics and drugs for malaria. There are high levels of knowledge about the importance of malaria testing among providers and clients interviewed, although practices lag behind. Although only 11 percent of patients received the recommended prepackaged treatment for malaria in the survey conducted in 2002, our 2004 study revealed that the drug most frequently cited as "most effective" by providers and clients is Malarine, followed by artesunate monotherapy. Clearly, if first-line treatment for malaria in this endemic area is known to be effective, why isn't it more commonly used?

In summary, the contradictions can be explained by ananalysis of underlying and competing factors. Findings suggest that Cambodian clients are not using the currently recommended first-line treatments for malaria for the following reasons—

1. Periodic stock-outs of dipsticks and antimalarial drugs in the public sector, particularly in Pailin. This no longer appears to be a major problem, except for stock-outs of pediatric suppositories. No pediatric suppositories were found in the operational district warehouse, either of the referral hospitals, public health centers, or at private vendors. The stock-out appears to be long term, for suppositories are not included in the commodity lists at the operational district, referral hospital, or health center level (Annex 5). For dipsticks, the district drug store uses alternative sources such as MSF as a temporary supplier. The efficiency of the drug supply system can be further improved, but links between the public and nongovernmental sector are effective. Private sector stock-outs of dipsticks and medicines do not appear to have a great impact due to the range of alternative private providers in the market areas.

2. Lab management problems at the public health center level. The sample size of public health facilities was necessarily limited. However, evidence of lab management issues can potentially be problematic in the long run because they can further erode the credibility of the public health service. The limited hours of public health center operation for testing (and treatment) are a broad barrier to malaria drug use and beyond the scope of rational pharmaceutical management.

3. The perceived role of the private drug seller and concurrent financial incentives. Responding to client demand has been a key theme throughout the interviews with private providers. Clients with limited funds sometimes prefer to purchase drugs initially because they have an insufficient understanding of the risk-benefit tradeoffs of testing. They trust the private practitioners even if these practitioners do not encourage testing. There are also provider barriers—limited profits from dipstick testing, the perceived disadvantages of dipsticks (e.g., identification of *P. falciparum* cases only, no indication of case severity). Moreover, if testing results are negative, the provider needs to have an alternative sale to make testing a worthwhile service.

4. There are opportunities to improve private sector testing for malaria. Decision-makers should explore profit-making schemes, such as the sale of bednets by the private sector, to create incentives which compensate for lost sales of inappropriate drugs for negative testing results. IEC efforts to emphasize the risk and benefits of testing to the general public and providers also need to be reinforced with stricter controls by the government.

5. Inappropriate dispensing and prescribing practices, including polypharmacy, in the private sector. Contributing to this again, is the client's reliance on the private practitioner even with inappropriate prescribing practices. Training, quality control, monitoring, and/or enforcing standards in the private sector, especially among village providers, including VMVs and VHVs, is essential to improve drug use. The government is in the process of enforcing licensing at the operational district level. Monitoring of the effect should be a priority.

6. Private practitioners prescribing and dispensing habits are at least partially driven by client demand for particular drugs and serums, often related to short-term cost-benefit rationales which are often costly in the long term. Again, IEC efforts need to focus on consistent messages about the ill effects of drugs which are inappropriate and benefits (financial and life) of appropriate drug use. Monitoring is a component of continuous quality improvement.

7. Lack of knowledge about first-line treatment and competent advice on drug use, especially for children, pregnant women, migrants, and severe cases. Public sector providers at the health center level were clear about the national protocol for malaria drug use. Not all referral hospital staff cited proper protocols, however. At least one private sector medical worker claimed that a certain doctor in one of the referral hospitals was inappropriately prescribing. This could not be verified. The research team was impressed by the knowledge and supplies of the VMV interviewed, suggesting the great potential of the roll-out of this component of the national malaria program.

    - For children aged 0-5, public health center staff claimed that use of suppositories was acceptable. However, the evidence at the district supply level was contradictory, as the claim was made that there is limited privacy for administering suppositories. Very few children are being seen at the public health center for malaria (< 10 percent of malaria clients at a Pailin site). Moreover, alternatives to suppositories are being used. Most often this is artesunate and mefloquine from pre-packaged A&M. Training should emphasize for health workers the correct dose in tablet form. There was no clear evidence that either public or private provider's give the first dose under supervision or tell the caretaker what to do if the child spits or vomits out the medicine.

    - For pregnant women, the predominant reaction to treatment of pregnant women by public and private providers at the primary care level is caution. Evidence of both appropriate and inappropriate treatments for pregnant women by the public health center was found. Moreover, private sector referral of cases to the public health services is positive, but delayed treatment can potentially life-threatening. High priority should be given to public and private sector knowledge being upgraded to

meet standard guidelines. Providers and pregnant women should be targeted with clear information on malaria risks so women do not confuse malarial symptoms with morning sickness. Training for providers should highlight the updated 2003 guidelines which stipulate the addition of a second-line choice of artesunate alone for seven days to improve compliance.

- For migrants, the higher probability of exposure to malaria and higher vulnerability due to weaker financial and social network resources should be met with targeted approaches to diagnose symptoms at their early stage.

- For severe cases, most referral hospitals used intramuscular (IM) artemeter rather than rectal suppositories for adults, as suppositories are not in supply. If properly trained and supervised, public health center workers should be able to give IM injections since they are not supplied with suppositories and there appears to be historically a problem with stocking them.

8. Product packaging. This study confirmed that packaging of inappropriate drugs in small sachets is common practice, and found it especially common among lay drug sellers who lacked knowledge of first-line drugs. The vicious cycle of client demand for a few affordable drugs and sales by private providers should be replaced with cost-effective packaging of affordable drugs. IEC is one way to reinforce to the publice that improperly packaged sachets of mixed drugs can be useless, costly, and even dangerous as it leads to drug resistance.

9. Lack of client adherence due to inadequate knowledge and habit. In the initial quantitative survey, of drug regimes actually taken, 54 percent were of inadequate duration. This implies that patients receiving an inadequate dose may be due more to an inadequate dosing regime being recommended by the prescriber (provider non-compliance) rather than the patient non-compliance. In fact, there was strong evidence of both provider and patient non-compliance in the current study. Side effects have previously been cited as a potential cause of patient non-compliance. However, provincial level staff claimed that side effects are no longer a significant problem. The freelisting data indicated that side effects were a reason clients preferred one drug over another, but there was not overwhelming evidence from the in-depth interviews that client non-adherence was due to side-effects. Non-adherence was more often due to lack of knowledge, feeling better, and a tendency to share the rest of the drugs with family members or neighbors suffering from malaria. These factors result in incomplete duration and improper dosage regimens. Clearly, a dual-prong strategy aimed at providers and clients is appropriate for improving adherence. Incentives and enablers could play a role.

10. Public sector quality of care. A key strategy for the MoH, which goes beyond malaria control, should be to strengthen the quality of care in the public health services. Clients mentioned interpersonal relations and time costs in waiting as key disincentives for use of the public sector. The stigma of “public health centers are for the poor” is another barrier. As quality of care is improved, patients tend to recognize the benefits. Such measures will not address access costs to the client, such as transport and time away from work to

travel to a public health center. However, use of the public sector minimizes the risk of receiving fake drugs on the open market.

CONCLUSIONS

Cambodia's National Malaria Center is addressing the final link in the cycle of malaria drug selection, procurement, distribution, and use. This study has sought to address unanswered questions concerning malaria drug use. Policy makers and implementers can use this qualitative data along with quantitative findings to improve drug use.

We recommend that this report be a resource to further implement and enforce supportive drug use policies, to improve providers' practices (advice and testing, prescribing, and dispensing), and change clients' behavior to enhance appropriate drug use. Further steps need to be taken to enforce regulations for private practitioners and train them on first-line treatment.

Strategies should directly target the private sector while enhancing quality of care in the public sector. The private sector continues to be the main source of drugs for the population suffering from malaria. Practitioners are still inappropriately prescribing drugs. For this reason, appropriate incentives and disincentives need to be put in place for private practitioners to follow the National Treatment Guidelines. The quality and coverage of malaria services are improving with the expansion of the VMV and VHV program, which should continually be monitored for appropriate testing, A&M distribution, and appropriate drug use by the client. At public health centers, resolving lab management issues can make the difference between good and poor quality results. The national protocol on appropriate drug use should be consistently implemented across referral hospitals. A major challenge is changing clients' behavior. Lack of client adherence is largely due to inadequate knowledge, habit, and insufficient instructions by providers. The social marketing program is in the process of addressing this issue. Incentive and enabler approaches and educational strategies for clients can enhance these strategies.

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ANNEX 1. SUGGESTIONS ARISING FROM THE 2002 COMMUNITY DRUG USE PRACTICES IN MALARIA IN CAMBODIA

The objective of the Community Drug Use Practices in Malaria in Cambodia survey conducted in 2002 was to answer questions about "what" and "how much" drugs are being prescribed and taken. It was *not* designed to answer questions about *why* drug providers and users behave in a certain way. Consequently, one of the suggestions arising from discussions following this survey was to design and implement a qualitative study to understand these "why" questions.

Suggestions have been roughly divided into issues of (a) availability/affordability, (b) knowledge and acceptability (areas where more information is required), and (c) IEC.

Public Facilities

Diagnosis—Only half of the patients receiving antimalarials received a blood test diagnosis. The reason for this needs to be investigated.

- Availability: Was this a problem of dipstick "stockouts"? How frequently and for how long? Why? How is this being monitored? How can it be improved?

    - Was there another reason that blood tests aren't being done?
        - Lack of facilities
        - Lack of lancets
        - Believes in drawing blood clash with local beliefs

    - Children < 6 years: No children received the recommended treatment for the age group.

- Availability: Are pediatric suppositories available all the time? If not, how severe are stockouts. How is this being monitored?

- Knowledge and acceptability: Do providers know how to use them and how to teach parents how to use them? Are they acceptable to providers and patients?

- IEC: Clearly an alternative to suppositories is being used. Most often this will be artesunate and mefloquine from pre-packaged A&M. From a practical standpoint, even though suppositories are recommended, perhaps health workers should be given information and training on how to give the correct does in tablet form in case the suppositories are unavailable or unacceptable. It is important for providers to give the first dose under supervision and to tell the caretaker what to do if the child spits or vomits out the medicine.

- Pregnant women: Only four out of 27 pregnant women (both private and public sector) received the recommended treatment of quinine monotherapy.

- Knowledge and acceptability: More information is needed about this group as there is very little known (except for a study done on ethnic minority women in Rattanakiri). Anecdotal experience suggests a reluctance to take "strong" drugs during pregnancy. Poor compliance to seven-day regimens of quinine has been documented elsewhere and is likely to be the case here.

- IEC: Without more knowledge, attitudes, and practices information on pregnant women and malaria it is difficult to make recommendations. The recent guidelines (2003) have a new section on the management of malaria in pregnancy with the addition of a second-line choice of artesunate alone for seven days. If treatment cannot be supervised for seven days it is likely that compliance to this regimen will be better (fewer side effects and reduced frequency) than with quinine. This could be highlighted during training.

- Severe malaria (drug choice and duration): None of the health centers recommended artesunate suppositories prior to transfer to a referral hospital, as recommended by the national guidelines. Twenty-nine percent did not recommend any antimalarial. This is a serious concern and should be addressed.

  - Availability: How oftern are rectal artesunate suppositories out of stock? What alternative is available? Most health center workers are able to give IM injections. Could they be provided with IM arthemether if rectal artesunate is unavailable?

  - Knowledge and acceptability: Are there problems of knowledge or acceptability of rectal suppositories (by providers and patients/relatives)? If so, how can these be addressed?

- Uncomplicated malaria (drug choice and duration): Eighty-three percent of public facility respondents said they would recommend A&M (Drug Outlet Survey). Only 23 percent of patients said they received A&M if they went to a public health facility, with artemisinins alone and quinine and tetracycline being the most common prescriptions. For drug regimens other than A&M, the duration of therapy was seldom adequate.

  - Availability: How often are there stock outs of the three types of A&M packages? Artesunate in a "loose" form (i.e., not prepackaged with A&M) is not supposed to be available in public health facilities. Where is it coming from? How can it be controlled?

  - Knowledge and acceptability: Knowledge of the recommended regime appears to be good. It may be that the use of artesunate monotherapy is due to problems of mefloquine acceptability. This would be worth exploring further.

  - IEC: Emphasis needs to be placed on the advantage of mefloquine in reducing the duration of artesunate therapy from seven days to three days and the high risk of late recrudescence if this is not complied with.

- What are other reasons for not prescribing first line therapy? No personnel available? Costs associated with traveling to the health center? Cost sharing?

Private Providers

Diagnosis: Two-thirds of providers did not have the means to test for malaria.

- Availability: Dipsticks have theoretically been available through the social marketing scheme, but does not seem to have penetrated deeply.

- Knowledge and acceptability: There appeared to be a real willingness to learn about and use dipsticks, but the current level of knowledge about their existence and availability appears to be quite low (personal observation). An assessment of training needs may be useful.

- IEC: Through IEC of village level providers, demand (and supply) could be stimulated. Providing private providers with face to face training and information about where they can obtain dipsticks may be an excellent way of improving case management of malaria cases. Some thought needs to go into what advice is given regarding the treatment of dipstick negative cases as a decrease in inappropriate antimalarials may just result in an increase in inappropriate antibiotic use.

- Acute uncomplicated malaria (drug choice and duration): Fifty percent of market providers and only 11 percent of village providers would have offered artesunate and mefloquine. Of all prescriptions recommended, 35 percent (market) and 56 percent (village) were inadequate. Of drug regimes actually taken, 54 percent were of inadequate duration. The implication is that patients receiving an inadequate dose is due more to an inadequate dosing regime being recommended by the prescriber (provider non-compliance) rather than the patient non-compliance. Is this actually true, though?

    - Availability: Artesunate monotherapy is more easily available, more widely known, and often cheaper than Malarine. This is the biggest problem as it is seldom used long enough (seven days), resulting in recrudescent infections (and increased risk of development resistance). It is difficult to restrict the availability of artesunate monotherapy; the only solution is to increase the accessibility to Malarine, perhaps by making it cheaper.

    - Cotexin compound (Artekin,® DHA with piperaquine +/- trimethoprim) is also widely available and popular. Unlike artesunate monotherapy, it is a co-formulated combination therapy and is very effective in a two-day course. Therefore, the main disadvantage of this drug is that it competes with Malarine. It is also still undergoing clinical trials, although evidence so far shows it to be safe. It is licensed in Cambodia and is likely to become the recommended drug.

  - IEC: Providing private providers with the national guidelines and, if possible, training, may improve adherence to the government recommendations. This is particularly important at the village level where they often act as consultants.

- Polypharmacy (and use of injections): This is particularly widespread at the village provider level.

  - Availability: Increasing the use of dipsticks, and therefore accurate diagnosis, should decrease the need to treat for many diseases.

  - Knowledge and acceptability: The acceptability of prescribing fewer drugs and giving drugs orally may be limited by the need to make a profit.

  - IEC: Encourage longer courses of treatment rather than many drugs (same amount of money). Actively discourage the use of steroids and injections (vitamins and chloroquine). For severe patients, possibly encourage the replacement of current vitamin infusions with glucose infusions.

- Severely ill patients, pregnant women, and children: Many of the comments in the section on public facilities are relevant here. The emphasis should be on referring these cases as soon as the first dose of IM artemether or rectal artesunate has been given.

Community

- Knowledge and acceptability: Using community participatory approaches would be useful to understand more about the community beliefs and attitudes, such as—

  - The value and consequence of diagnostic test
  - Injectable medicines
  - The acceptability of rectal drugs
  - The acceptability of taking drugs during pregnancy

- IEC: As part of the social marketing project, there were TV and radio advertisements promoting the use of Malarine (with a little time allocated to promoting dipsticks). If there is to be a future campaign, perhaps more time should be devoted to dipsticks and the fact that the same drug and dipsticks are available for much less in health centers. During provider to patient contact, emphasis needs to be placed on the importance of completing the best drug treatment with a clear explanation of the costs and consequences of taking shorter (cheaper) treatments.

ANNEX 2. TYPES OF PRIVATE HEALTH PROVIDERS IN CAMBODIA

The private health sector in Camboida is not homogenous. There is considerable overlap between the public and private sectors. The lines between public and private sectors, self-medication and professional treatment, legal and illegal providers, clinics and pharmacies, are all blurred. Following is a list of important private health providers in Cambodia

Pharmacies. These are legal outlets selling a wide variety of medicines. They are licensed under the name of a trained pharmacist. Most pharmacies are located in Phnom Penh. They receive their drug supply from company representatives who distribute directly to most provincial capitals and district towns.

Pharmacy Depot A and B. Depots are licensed (legal) outlets registered under the name of a pharmacist or a medical assistant. Depot A is permitted to sell 60 kinds of essential drugs and Depot B may sell 20 kinds of essential drugs. Pharmacy depots are located in urban areas like provincial or district towns.

Drug Vendors. This category includes all drug vendors who display the green pharmacy cross (which indicates to the public the presence of a qualified pharmacist or drug seller) without having a license. This category includes drug stalls in rural markets and shops whose main business is selling medicine. The majority of drug vendors in Cambodia fall in this category. They obtain their drug supply from company representatives. Some drug vendors buy their supply from legal pharmacies or pharmacy depots.

Private Cabinets/Clinics. These are divided into "legal" clinics, including all licensed medical providers who display the blue medical cross (indicating to the public the presence of a qualified medical person), and "illegal" clinics operated by unlicensed private providers. The legal clinic is registered under a licensed medical doctor who does not have another job. The license for operating the clinic is obtained from the MoH. The illegal clinics, which form the majority of private medical practices in the country, are operated by unlicensed practitioners or the clinic itself is not registered at the MoH. This category includes polyclinics, clinics, and consultation rooms.

Shopkeepers/Village Drug Sellers (nek luok thnam). These are small shops or stalls selling a variety of general merchandise and a variety of modern medicines ranging from paracetamol and birth control pills to tetracycline and penicillin. This type of private provider comprises the majority of venders of modern medicine in Cambodia. They buy their medicines in small quantities from the closest pharmacy, usually located at the district level.

Source: Assessment of Official Private Providers and Delivery of Health Care Services to Children under Five, Program for Appropriate Technology (PATH), Cambodia, 2002.

ANNEX 3. COMMODITIES SELECTED AT THE LEVEL OF OPERATIONAL DISTRICT, REFERRAL HOSPITAL, AND HEALTH CENTER

Pailin , OD Drug Store Malaria Drugs

ល.រ N°	កូដ Code	ឈ្មោះឱសថបរិភោគរោគ Commodity Name	ទ្រង់ទ្រាយ Form	កំរិត Strength	ចំនួនសល់ Int. Stock	ចំនួនទទួល Incoming	សរុប Total	ចំនួនចេញ Outgoing	សល់ប្រើការ Balance	ចំនួនត្រូវការ Req. Qty	សម្គាល់ Observation
2. Tuberculosis Medicines											
378	AA18	Ethambutol	TAB	400mg	11,859	5,000	16,859	5,400	11,459	0	
379	AA191	Ethambutol / Isoniazide	TAB	400/150mg	10,380	0	10,380	6,500	3,880	6,000	
380	AA26	Isoniazide	TAB	100mg	0	0	0	0	0	4,000	
381	AA52	Pyrazinamide	TAB	500mg	5,500	0	5,500	2,000	3,500	4,000	
382	AA55	Rifampicine	GEL	150mg	0	0	0	0	0	4,000	
383	AA56	Rifampicine / Isoniazide	GEL	150/100mg	10,880	5,000	15,880	700	15,180	0	
384	AA561	Rifampicine /Isoniazide	SACH	60/30mg	0	0	0	0	0	0	
385	AA562	Rifampicine/Isoniazide/Pyrazinamide	SACH	60/30/150m	0	0	0	0	0	0	
386	AB43	Streptomycine	FL	1gr	200	200	400	50	50	100	Tra.t:300
387	AA521	Pyrazinamide	TAB	400 mg	5,000	10,000	15,000	0	15,000	0	
3. Malaria Medicines											
388	AA07	Chloroquine (Base)	TAB	250mg	200	0	200	200	0	4,000	
389	AA32	Mefloquine	TAB	250mg	50	0	50	50	0	2,000	
390	AB39	Quinine Dihydrochloride	AMP	600mg	370	0	370	20	0	200	Outr:350
391	AA48	Praziquantel	TAB	600mg	0	0	0	0	0	0	
392	AA53	Quinine Sulfate	TAB	300mg	0	5,000	5,000	3,000	1,000	5,000	Outr:1,000
393	AA59	Tetracycline	TAB	250mg	0	0	0	0	0	3,000	
394	AOT01	Artemeter	AMP	80mg	401	0	401	200	201	450	
395	AOT010	Artemether	TAB	50mg	0	0	0	0	0	3,000	
396	AOT02	Artesunate	TAB	50mg	0	0	0	0	0	6,000	
397	AOT020	Artesunate Rectocap	TAB	50mg	0	0	0	0	0	1,000	
398	AOT0201	Artesunate Rectocap	TAB	200mg	0	0	0	0	0	600	
399	AOT021	Artesunate	TAB	100mg	0	0	0	0	0	2,000	
400	AOT14	Artemisinin	SUPP	100mg	0	0	0	0	0	0	
401	AOT141	Artemisinin	SUPP	200mg	0	0	0	0	0	0	
402	AOT142	Artemisinin	SUPP	300mg	0	0	0	0	0	0	
403	AOT143	Artemisinin	SUPP	500mg	0	0	0	0	0	0	
404	AOT16	Blister A + M3 Blister	Blister	50+250mg	560	200	760	160	600	400	
405	AOT17	Blister A + M4 Blister	Blister	50+250mg	1,420	0	1,420	280	1,140	0	
406	AOT15	Blister A + M2 Blister	Blister	50mg / 250	620	200	820	100	720	300	
407	AOT022	Malarine	Blister		105	0	105	30	75	500	
4. Birth Spacing											
408	AA35	Microgynon	Blister		545	100	645	170	475	200	
409	AA40	Ovrette	Blister		110	100	210	90	120	200	
410	AB12	Depoprovera+Seringue Disp 2ml	FL	150mg	0	0	0	0	0	300	
411	AB123	Depot Medro Progest Ace+ Syr+Ndle	FL	150mg/3ml	250	100	350	200	150	200	

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Drug Commodities Selected for Sampov Lun Referral Hospital for Contract

No	Code	Commodity Name	Form	Strength
1	AA011	Acetyl Salicylic Acid	TAB	500 mg
2	AA02	Aluminium Hydroxide	TAB	500 mg
3	AA03	Aminophylline	TAB	100 mg
4	AA04	Amoxycilline	TAB	250 mg
5	AA08	Cimetidine	TAB	200 mg
6	AA10	Cloxacilline	TAB	250 mg
7	AA11	Cotrimoxazole	TAB	100+20 mg
8	AA12	Cotrimoxazole	TAB	400+80 mg
9	AA14	Diazepam	TAB	5 mg
10	AA15	Digoxine	TAB	0.25 mg
11	AA201	Ferrous Sulfate+Folic Acid	TAB	60+0.40 mg
12	AA21	Folic Acid	TAB	5 mg
13	AA22	Furosemide	TAB	40 mg
14	AA23	Hydralazine	TAB	25 mg
15	AA24	Hydrochlorothiazide	TAB	50 mg
16	AA25	Indometacine	TAB	25 mg
17	AA31	Mebendazole	TAB	100 mg
18	AA34	Metronidazole	TAB	25 mg
19	AA35	Microgynon	Blister	
20	AA36	Multivitamines	TAB	
21	AA39	O.R.S. (for 1 L)	SACH	
22	AA40	Ovrette	Blister	
23	AA43	Paracetamol	TAB	100 mg
24	AA44	Paracetamol	TAB	500 mg
25	AA45	Phen Meth Penicilline	TAB	250 mg
26	AA49	Prednisolone	TAB	5 mg
27	AA50	Promoethazine	TAB	25 mg
28	AA52	Pyrazinamide	TAB	500 mg
29	AA56	Rifampicine / Isoniazide	GEL	150/100 mg
30	AA61	Vitamine B1	TAB	250 mg
31	AB031	Ampicilline	FL	1 g
32	AB04	Atropine Sulphate	AMP	1 mg
33	AB05	Butyscopolamine	AMP	20 mg
34	AB07	Calcium Gluconate 10 %	AMP	1 gr
35	AB11	Cloxacilline	FL	1 gr
36	AB123	Depot Medro Progest Ace+Syr+Ndle 15mg/3ml	FL	
37	AB15	Diazepam	AMP	10 mg
38	AB18	Eau Pour Injections	AMP	5 ml
39	AB22	Furosemide	AMP	20 mg
40	AB23	Gentamycine	AMP	80 mg
41	AB26	Ketamine	FL	500 mg
42	AB272	Lidocaine 2 %	FL	50 ml
43	AB31	Metronidaol 100ml	FL	500 mg
44	AB34	Penicilline – G, IM/IV	FL	1 MUI
45	AB40	Salbutamol	AMP	0.5 mg
46	AB41	Sodium Bicarbonate 8.4 %	AMP	50 mg

Commodities Selected for Health Center for Contract

Code	ommodity Nam	Form:	Strenght:	Con_HC
1	AA011	Acetyl Salicylic Acid	TAB	500mg
2	AA02	Aluminium Hydroxide	TAB	500mg
3	AA04	Amoxycilline	TAB	250mg
4	AA11	Cotrimoxazole	TAB	100+20mg
5	AA12	Cotrimoxazole	TAB	400+80mg
6	AA201	Ferrous Sulfate+Folic Acid	TAB	60+0.40mg
7	AA17	Erythromicines	TAB	250mg
8	AA311	Mebendazole	TAB	500mg
9	AA34	Metronidazole	TAB	250mg
10	AA35	Microgynon	Blister	
11	AA36	Multivitamines	TAB	
12	AA39	O.R.S (for 1 L)	SACH	
13	AA40	Ovrette	Blister	
14	AA43	Paracetamol	TAB	100mg
15	AA44	Paracetamol	TAB	500mg
16	AA45	Phen Meth Penicilline	TAB	250mg
17	AA50	Promethazine	TAB	25mg
18	AA52	Pyrazinamide	TAB	500mg
19	AA56	Rifampicine / Isoniazide	GEL	150/100mg
20	AB123	Depot Medro Progest Ace+ Syr+Ndle 15mg/3ml	FL	
21	AB272	Lidocaine 2%	FL	50ml
22	AC07	Ringers Lactate (+Set)	FL	1000ml
23	AOT17	A + M4 Blister	Blister	50+250mg
24	BA011	Adhesive Tape Zinc Oxid roll	Roll	18cm x 5m
25	BA17	Condoms	PCS	49mm
26	BA18	Cotton Wool	ROLL	500gr
27	BA21	Gauze Rolls	ROLL	90cmx91m